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Mysteries of Nature

Peculiar occurrences that defy explanation

By ARCHIBALD RUTLEDGE

Illustrated by Eleanor P. Custis

WHILE man has opened some of the pages of the green gigantic book of Nature, and has come to understand what meaning those pages hold, there are other pages which, though opened, remain as mysterious as if the writing were in some language for which no key had been found. Because I have been privileged to roam the wilds for more than forty years, invading wildernesses into which few or no other men ever penetrate, I have learned some things about Nature. But I have come on some things that I could in no way explain. A consideration of a few of these rather occult manifestations adds, I think, to the interest of life; for human nature is inclined finally to view as banal whatever is so obvious as to be readily apprehended.

The secretary of the Santee Gun Club gave me, some years ago, the privilege of roaming at will the magnificent wildwoods of that 40,000-acre preserve, in order that I might study the birds and animals there, where they remain in such original abundance as to lead one to believe that he is walking in aboriginal America.

One day, in an open pine glade, not far from the borders of that mighty stretch of reedland known as Blake's Marsh, I came upon an enormous bull alligator, a regular primordial dragon. There he lay like a dreadnaught, stranded far inland by some ghastly convulsion of Nature. He was at least a mile from any body of water in which he could naturally make his home. This circumstance could be accounted for by the fact that these saurians sometimes crawl long distances overland. But the thing I could not understand was the condition of the old armored brigand. From the tip of his burly snout to the end of his tail he was a perfect wreck. He was dead. His broad malignant head, his burly body, his massive tail—all were literally cut to ribbons. There were great gaping holes through his ponderous bulk. It was as if some enemy, far his superior, had wreaked upon him vengeance, and had done so with needless and devilish ferocity. Since his dread encounter, a heavy rain had fallen, so that I was unable to identify any tracks of an assailant. The old brute looked as if he had been a target for shrapnel from a whole battery of guns.

From the condition of the ground I could tell that the fray had been a desperate one; grass and bushes were matted and broken. Heavy stains of blood were still visible despite the rainfall. The bark on one side of a yellow pine had been slashed away, as if from a terrific glancing blow. The grim old marauder had put up a battle. But what had attacked him? Save man, the alligator, especially if he is mature, has few natural enemies. And no man had done this thing. It was done by some other wild creature.

I do not know what did it. I believe no other alligator, however formidable, could have made such a shambles of this monster of the wilds. A deer, even a buck in the mating season, when he is likely to be truculent, prefers to give a 'gator a wide berth. An old razorback boar, that will eat a striking rattlesnake, however large, with comical indifference, with colossal *ennui,* might "take on" a bull alligator out of his native element. A herd of razorbacks, that are capable of fiendish things, might have done this. But I do not know. The nature of the wounds did not lead me to identify them as having been inflicted by any creature known to me; and I know all the wild creatures of those woods. The murder of that old solitary bull remains a mystery. I only know that his assailant must have been terrible both in his strength and in his wrath. Only triumphant hate could produce such a malignant orgy of mutilation.

When I was a boy, I used to spend my summers in the mountains of western North Carolina; and often I went berry-picking with two mountain children, a boy and a girl of about my age. One day when we were starting on an expedition after blackberries, the children's mother asked the little girl to take the baby with her, as there

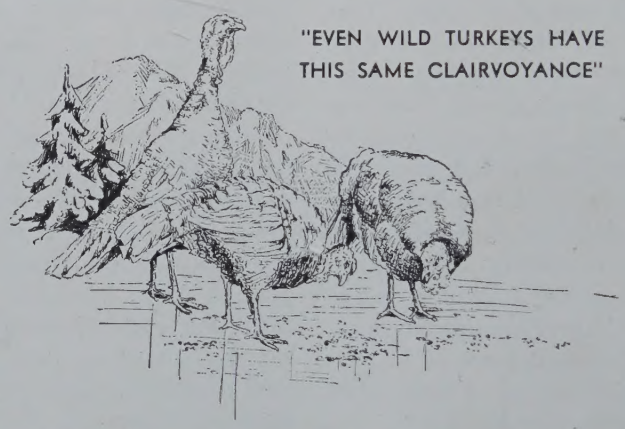
was much housework to be done. This tot was about fourteen months old.

Our berries grew along an old rail fence. When we got there, the little girl, choosing a V of the fence where there were no bushes or briars, and where the grass was thick and soft, set the baby down there. We then started to fill our pails. At no time were we far from the child, and every few minutes the girl would return to the place to see if all was well.

After perhaps a half-hour, when we were thinking of moving to another spot, we walked slowly toward the baby, picking berries as we approached. As we drew near, all of us heard the baby talking, babbling elfinly as he used to do when he petted a dog or a cat or a doll at home.

"Now, I wonder what he's talking to," said the girl. Then she gave a sudden wild scream.

The brother and I ran up; and what we saw you will hardly believe because it is one of these mysteries of Nature: a big rattlesnake lay full length across the baby's extended bare legs; and the little child was patting it gently on the head and talking to it. Here the apparent mystery of why the snake did not strike the child might be explained by saying that the baby's whole attitude and demeanor were disarming in their naïve innocence. Yet there was something miraculous about the scene. I felt as if I were looking at the Millennium. While we stood terrified, utterly unable even to think what to do, the baby saw us. Thereupon he proceeded to crawl over the rattler, and to come toward us on hands and knees, babbling happily all the time. I suppose the infant's touch had been a caress; and practically all wild things (and tame things and human beings) like to be caressed. At any rate the snake continued to lie full length in the sun, complacently quiet. "The little child shall play on the hole of the asp," I think the Bible says. I have seen it done.



"EVEN WILD TURKEYS HAVE THIS SAME CLAIRVOYANCE"

For performances in Nature verging on the occult I could cite many examples of the premonitions of animals. Their power in this respect is baffling beyond description. Deer, for example, I have seen leaving sheltered glades, where they have been weathering out a long storm, and go trooping up to exposed slopes of a mountain, where, many hours later, the sun would shine; and while there was no sign of a storm, they would seek some remote sanctuary, knowing that bad weather was coming. They must be equipped with sentient barometers; for certainly they are able to forecast weather, fair or foul, sometimes for a whole day in advance. I have observed that grouse, wild turkeys, squirrels, and even humble wood-mice have this same clairvoyance. On my plantation, whenever we have a flight of woodcock, we can expect a cold wave within thirty-six hours. These birds, knowing of the change in weather that is coming, move from the North Carolina coast to that of South Carolina, the flight taking but a few hours. They obtain all their food by boring in the ground with their long bills; and they get no breakfast when the ground is frozen. I have known a flight of woodcock to arrive one twilight, and the cold wave to arrive twenty-four hours later.

Both animals and birds appear to be aware of the significance of death, and sometimes they do strange things in relation to it—things for which I have tried to account, and have utterly failed.

One of my close friends is a physician who lives in one of the larger cities of Pennsylvania. He had a friend who owned a beautiful English setter named Rodney. The doctor had been wanting a bird-dog, and several times had been to see this one, hoping to be able to buy him. The owner, while unwilling to part with him, was quite willing to mention Rodney's good points.

"He's the only dog I ever tried to keep in the city that never disturbed the neighbors. Rod never makes a sound, even when the moon is full. I don't think I ever heard him bark or howl, and he never bothers anyone."

One night the doctor got a call from a gas station some ten miles out of town. The call came from a man he knew.

"Say, Doc," said the excited voice, "can you come out right away? We have had a hold-up here, and a man has been shot. You better hurry, because this fellow is in a bad way."

Reaching the station twenty minutes later, the doctor found that there had been a hold-up of the gas station; and during this performance, a customer had driven up and stopped for gas. The two hold-up men, thinking themselves trapped, had abandoned their siege, and as the customer stepped from the car, they shot him, and then made good their getaway. The man they had shot was Rodney's owner.

The physician found the wounded man barely alive. He at once phoned for an ambulance; and while waiting for its arrival, he gave the doomed victim what relief he could. He called the hospital and arranged for an immediate transfusion and all other care possible.

"I will be there almost as soon as you are," he told the driver of the ambulance. To the owner of the station he said: "On the way to the hospital I am going to stop at John's home and break this news, and probably take his wife on to the hospital with me."

Arriving at his friend's home, he could get no response to his rather frantic knocking and his ringing of the bell. But he heard voices in the backyard; and, being perfectly at home, he hurried to the rear of the house. The wife of the murdered man and his two children were standing beside the tiny yard where Rodney was kept. The dog

was dashing madly up and down, his hair bristled. He was barking wildly; and every few seconds he would pause, throw back his head, and give vent to a melancholy howl. It was evident that something was dreadfully wrong, especially considering Rodney's placid temperament.

"Why, Doctor," said the woman, "I am so glad you have come. We can't imagine what has come over Rod. He started this about three-quarters of an hour ago, and we can do nothing with him. I'm half afraid that something has happened to John."

That story comes from a man who believes nothing that cannot be proved in a laboratory; yet he admitted to me, somewhat reluctantly, that the thing savored of mystery. I agreed with him; but I was not greatly surprised over it, having known many other cases of a somewhat similar nature.

Once I went into the mountains during a time of very deep snow, carrying a bag of corn to feed wild turkeys. High on a level bench of the mountain there was a field of about an acre in extent that a farmer had planted in buckwheat. This field was now two feet deep under snow, and the snow had a crust on it. Passing this open place, I saw a gray squirrel come out of the frozen woods and scamper across the snowy field, slithering and sliding on the crust. As he got near the centre of the field, he slowed down, then paused as if he were reconnoitering. For some minutes he considered deeply. Then, as if he had solved the problem at hand, he ran ten paces farther, and at once began to scratch at the crust on the snow. Soon he had a hole through the thin ice; then the snow flew fast as he hurried his dredging operations. He completely disappeared from sight under the snow. Shortly, however, he emerged, a black walnut in his mouth. With his dinner thus secured, he scampered merrily back to the woods.

But how did that squirrel know exactly where that nut was, under two feet of snow and an ice-crust? No doubt he had cached it there long weeks or months before. My idea is that wild creatures have marvelous precision of memory, and they have likewise some system of their own whereby they mark places to which they wish to return; the marking is done only in their minds, but it remains so indelible that it makes us wonder. And anything that is slightly beyond my ken is mystery to me.

"A BIG RATTLESNAKE LAY FULL LENGTH ACROSS THE BABY'S EXTENDED BARE LEGS"

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We have received a number of inquiries from teachers and others asking whether extra copies of our Rotogravure Section could be obtained separate from the magazine. Most of these teachers wanted the extras for mounting, posting, scrapbook, or other class projects.

Owing to certain mechanical considerations in connection with printing the magazine, we have on hand some extras of the Rotogravure Sections from October, 1934, to September, 1935, inclusive. These are untrimmed and admirable for the above-mentioned purposes. The task of collating these, and the cost of mailing them, have made us hesitate about announcing their availability. However, there appears to be a definite demand and use for them.

Therefore we are making available complete, unbound and untrimmed sets of the first twelve months (192 pages of Nature pictures) of the Rotogravure Section at one dollar a set, or the first or last six months (Oct., 1934, to Feb., 1935, or March, 1935, to Sept., 1935) at fifty cents a set. Extras of one particular month are available at ten cents each as long as they last and *provided at least ten extras from any one month are ordered at one time.* In the event that one or two months of 1934-1935 become exhausted it may be necessary to substitute separates of some more recent issues to complete the set of twelve.

HORSESHOE CRAB

The female *Limulus* burrows into the sand above high water mark to lay her eggs

A Modern Fossil In Armor

By ELSIE A. PARRY

Photographs courtesy American Museum of Natural History

ANCIENT TRILOBITES

Found in the Burgess shale quarry, Field, B. C. Note well preserved feet and antennae

THE beach had a newly-swept look. The last high tide, urged on by a full May moon, had charged up the gentle slope and, retreating, had carried with it all manner of untidy flotsam and jetsam. Only a ragged fringe of drying seaweed still marked the high water line. Our invading footprints were the first to mar the clean symmetry of the smooth and shining expanse; or so it seemed. Suddenly, however, my eye was caught by a peculiar pattern drawn on the sand. A track some seven inches wide curved and wound around in an apparently aimless design, crossing and recrossing itself like the purposeless meanderings of a small child with a toy cart. Yet there were no footprints visible, human or otherwise, save our own. The markings had certainly been made since the retreat of the tide; what had made them? I stood there trying to puzzle out the meaning of the maze which seemed to have neither beginning nor end. Then I noticed near the high tide mark an upheaval in the sand that looked like the work of an industrious mole. The trail led to this mound but not away from it. Here, in very truth, the maker of the maze had buried itself in awkward and ostrich-like fashion. A little cautious digging brought the occupant to light—no mole, of course, but a large and indignant horseshoe crab! The crab's numerous legs, its carapace, and its dragging tail had made the queer tracks in the sand.

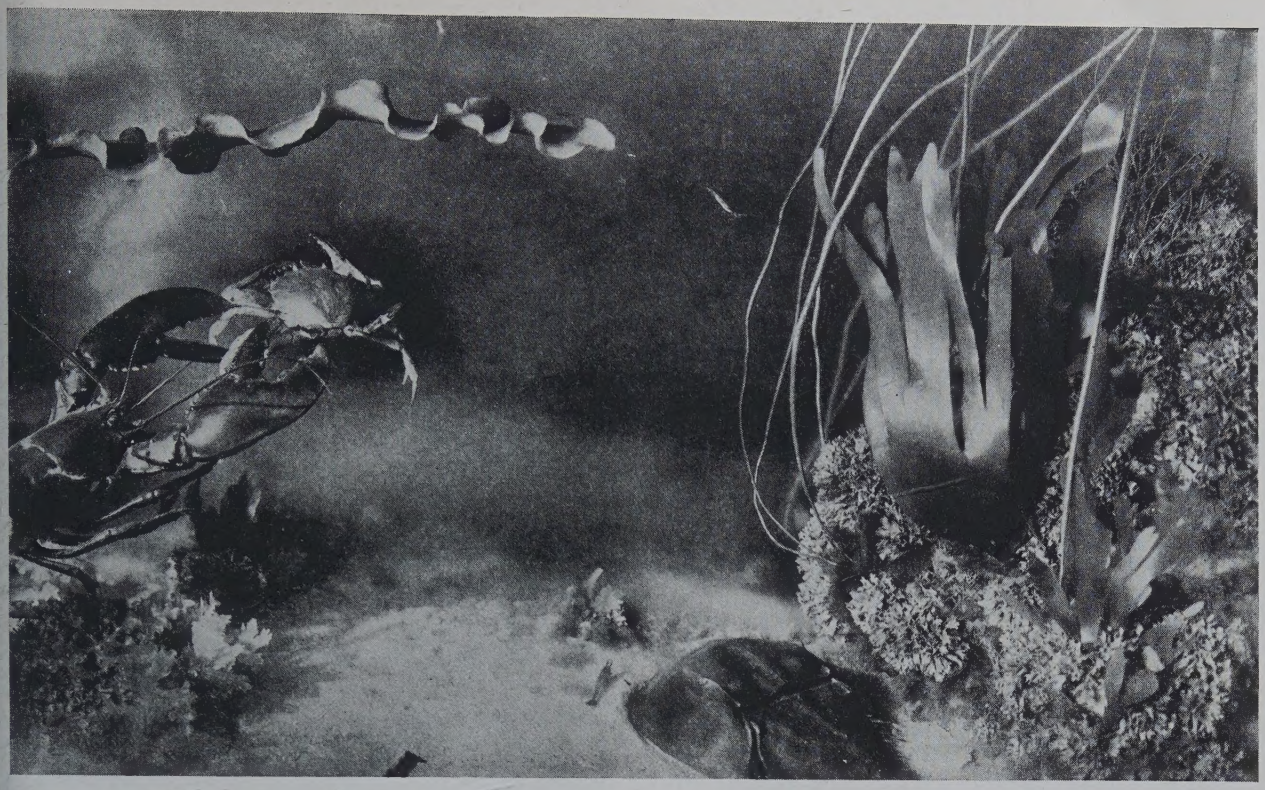
Judged by its intricate meanderings over the beach, this particular crab had had a difficult time finding a suitable place in which to hide. Under the circumstances, however, the caution was not surprising, for the crab was a female and she had chosen this spot as the right place to lay her eggs.

The horseshoe or king crab, *Limulus polyphemus*, belongs to an ancient and peculiar order of Crustacea. It boasts close kinship with the trilobite of the Coal and Silurian periods. Most of its nearest allies have disappeared from the earth, but *Limulus* still holds its own in the seas about China and Japan and on the northeast coast of North America. Anyone seeing it for the first time cannot fail to be struck by its resemblance to an armored tank. The enormously expanded head-shield protects all the anterior appendages beneath it and the creature looks upon the world through eyes fixed in the shield, for all the world like peep-holes in a blank wall. The designation *polyphemus* as applied to *Limulus* is hardly accurate, for the king crab is endowed, not with a single eye as was the Polyphemus of legend, but with four, two in the shield and two at the base of the first spine in the middle ridge of the carapace. The former are compound, the latter simple. Quality seems to have been sacrificed to quantity, however, for neither pair is especially efficient.

In *Limulus,* the posterior segments of shell, equipped with sharp spines, are so soldered together as to appear like one piece; the tail is a stiff whip of shell. Antennae, mandibles, maxillae, and maxillipeds have all been converted into walking legs and these, with the exception of the first and the sixth pair, have jaws at their bases. How appropriate is the name of the sub-class to which *Limulus* belongs—Gnathopoda or "Mouth-footed." The king crab's ancient relative, the trilobite, also carried teeth on its legs with which to macerate or tear food before it was swallowed.

Leaflike appendages under the abdomen of the crab enable it to swim after a fashion, but swimming is obviously not its forte in spite of the fact that it is one of the oldest inhabitants of the sea. Instead it pushes its clumsy way through sand and mud by means of its efficiently arranged feet.

Not only is the appearance of *Limulus* remarkable—



THE HORSESHOE CRAB IN NATURAL HABITAT

This museum group, a Martha's Vineyard scene, shows *Limulus* with his undersea companions, the lobster, lady crab and shrimp

it has an astonishingly prehistoric look—but in the embryonic and larval stages of the individual the ancestral forms are recapitulated. The young undergo all their earlier metamorphoses within the egg, which distinguishes them immediately from most of their crustacean relatives. In addition, the eggs are fertilized by the male after the female has deposited them in a hole in the sand. There are few crustaceans that fertilize their eggs in this way.

With so much of the unusual in her make-up and habits, it is small wonder that we viewed Madame Limulus at her egg laying with more than passing interest. This particular female had no cavalier dancing attendance upon her, which was strange, for as a rule the male persistently trails after his lady love, firmly grasping the two terminal points of her abdomen with his two heavy claws. Undoubtedly our lady was waiting for the rising tide to bring the gentleman to the hole she had already dug as a receptacle for her eggs, for *Limulus* ordinarily spawns under water. She had not yet begun to deposit her ten thousand or so spherical green eggs—as we discovered when we turned her over, to the accompaniment of frantically waving legs and tail.

Once laid where the falling tide will expose them to the warmth of the sun each day, the eggs are left to the mercies of chance, for Monsieur and Madame Limulus, their duty done, lumber off on business of their own. Hatching takes place in from fifty to seventy days, depending upon the conditions under which eggs were laid. The Rev. S. Lockwood, who did some research work with *Limulus* in the 70's, kept a collection of king crab eggs in a jar of sea water for 350 days before they finally hatched! During the period of incubation the embryo undergoes some astonishing changes, acquiring sundry organs and appendages. Then, after about three weeks, the little animal actually molts within the egg, just as it does later after hatching. It is able to move, now, within its membranous covering, which has obligingly grown larger to match the embryo's growth. By the time it is ready to hatch the embryo has taken on a distinctly trilobate appearance, strikingly like that of its ancient forbear, the trilobite of the Coal Age. Here are the trilobite's highly arched longitudinal ridge, the bent sutures between the segments of the posterior body, the strongly convex lateral plates on each segment.

With the rupture of the egg membrane the larva is set free. It is about one-tenth of an inch long and actively free-swimming. It has already lost some of its striking resemblance to the trilobite, but not until its next molt does the baby *Limulus* begin definitely to take on, in amusing miniature, the well-known characteristics of its parents. It has grown a tail by this time and it has withdrawn all of its abdominal organs and appendages safely beneath its head-shield. But it takes a full year before the tiny living "tank" can boast of a whole inch of length, even with several molts to its credit.

The molting, which takes place about once a year in the adult crab, is accomplished by the splitting of the anterior border of the carapace, at the union of the dorsal and ventral walls.

The king crab's romantic adventures in metamorphosis all take place, unfortunately, in its extreme youth. By the time maturity is reached all that (Continued on page 311)

That Oddity The Tortoise Beetle

By PAUL GRISWOLD HOWES

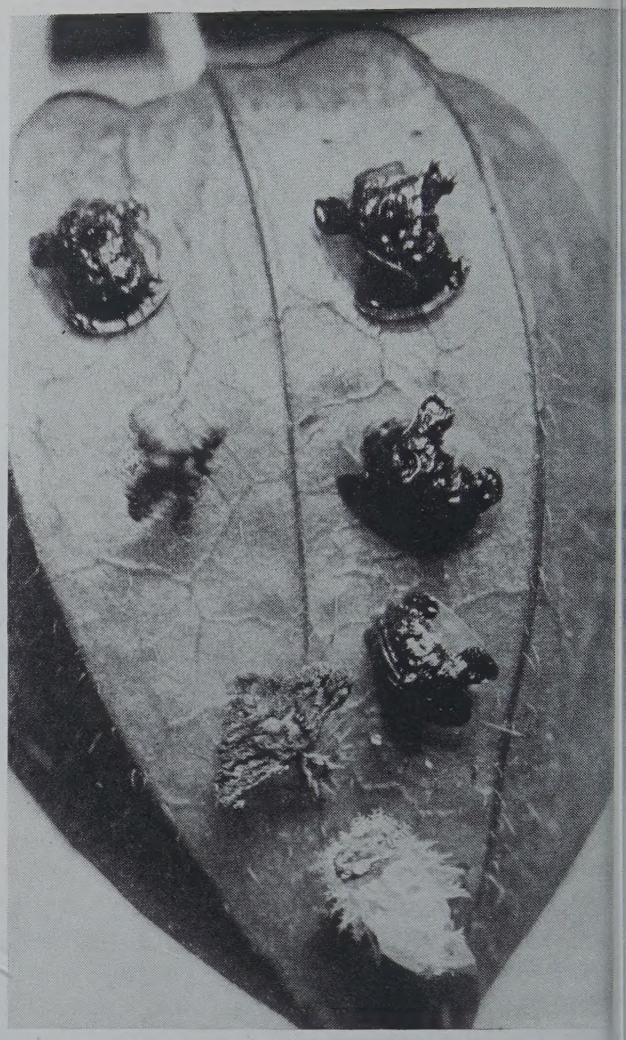
TORTOISE beetles in the adult form are not so remarkable, although they are often beautifully colored, their shells, or elytra, being tinged with gold and brassy hues, or yellow, orange and black. Because of the general shape, and the darker pattern that projects like a minute head and four legs on the lighter-colored elytra, the insects have been very aptly termed tortoise beetles.

Lately a species that I believe to be *Coptocycla signifera* has taken to laying its eggs upon the Chinese lantern plants in my garden. In the larval form it does considerable damage to the leaves. At first it is yellowish, turning to green as it grows older. Before the change to the pupal form, which takes place wherever the insect happens to be when it has eaten enough foliage, it is about a quarter of an inch in length.

Its remarkable form is shown plainly in one of the illustrations. It is a slug-like creature armed with beautiful white spines that project in a bristling row along the sides of its body segments. At the tail end, over the vent, is a distinct fork, and here is where we come to the remarkable habits of this insect. This tool is an excrement-fork, so constructed that as excrement is ejected, it is lifted up and held over the back upon the prongs of the fork! In addition to this load, the larva retains its various cast-off skins in the same manner, one neatly fitting into the other.

As time goes on, the body of the larva becomes almost hidden beneath this curious load of camouflaging material. At first glance the insects upon the leaves look like bird excrement or bits of shriveled vegetable matter. They hold their umbrellas, made of refuse, over themselves, and these covers, together with their spines, doubtless protect them from their natural enemies. The larger photograph shows a fruit of the lantern plant enlarged about four times. There are four adult beetles, larvae, and a pupa clustered on this one fruit, although the damage occurs only on the leaves of the plant. One larva is completely hidden under its umbrella.

I found these beetles and allied species feeding upon wild morning glory vines, but there is something in the leaves of the lantern plants that proves especially attractive. In my garden there are a good many of these hardy things, but during the summer of 1935 there was hardly a leaf that was not riddled by the larvae of the tortoise beetles. I let them eat their fill however, as these pictures and this little story seemed more important to me than a few unnecessary aliens.



ENLARGED PHOTOGRAPHS OF THE BEETLE

Above, note the tortoise-like pattern on the old beetles and the "umbrella" on the larvae. At left, the bristling white spines that serve as protection before the pupa stage is reached

Bats As Pets

A supposed pest exonerated

By ROBERT H. McCAULEY, JR.

FEW animals are subject to greater injustice at the hand of man than the bat. Notwithstanding his usefulness in destroying innumerable insect pests, the bat is almost universally an unwelcome guest. One that chances to fly into a room is immediately the cause of great feminine consternation and the inspiration for no less great masculine bravery. Usually, with the aid of a broom, the "awful thing" is destroyed. As in many other instances this fear and consternation result from misunderstanding and lack of knowledge.

My natural interest in the creatures of Nature despised and looked down upon by otherwise intelligent people caused me to return, one October day, from the exploration of a cave near Lexington, Virginia, with six bats in my pocket. Five were little brown bats, *Myotis lucifugus,* the sixth was a big brown bat, *Eptesicus fuscus.*

My first observation was interesting. The larger bat, when angered or frightened, emitted an odor not unlike the combination of a skunk and a fox den, which fortunately was offensive only for the distance of a foot or two. Soon, however, we became friends, and the bat ceased to become irritated by my approach or by being handled. In a few days all the bats took me sufficiently for granted and ceased to make any attempt to bite. When I let them fly around the room to exercise, occasionally one would come to rest on my shirt front or trousers. Apparently most of their fear had disappeared and when handled the bats clung to my fingers with toes and thumbs, and easily performed whatever gymnastics seemed necessary.

Because of the obvious difficulty of obtaining insects, the natural food of these bats, their diet was my immediate problem. The most likely food substitute seemed to be the scrapings of raw meat fed by means of forceps. Holding a bat in one hand, I put a morsel between his jaws as soon as he opened his mouth to bite. The first few attempts were unsuccessful. Finally one bat ate a little and immediately became enthusiastic. Soon all were eating meat. Each mouthful was carefully masticated, being shifted from one side of the mouth to the other on a slender pink tongue. The meal was never complete without a drink. Leaning on the edge of the water dish, a bat would take a mouthful with a slight sucking sound, and lifting its head a little, swallow it. This was especially interesting in comparison to the usual method of drinking while skimming on the wing over a pond or stream. Every evening scrapings of meat were placed in the cage on a piece of paper and each morning the platter was clean.

The jaws of a bat are quite strong as I found one day when I offered my bats a large piece of meat. One of them began to chew it, and when I tried to pull it away he would not let go. Spreading his wings a little, he let me lift him by his teeth, reaching upward with his hind feet to grip the tasty supply; then, wrapping his partly unfolded wings around it, he immediately resumed his meal. It did not appear to annoy him when he was laid upside down on the table. His only reaction was to hold the meat with his hind feet as a baby holds a bottle. On another occasion one of my new-found pets lifted a piece of beef several times his own weight while hanging by his toes from my finger.

"HELLO FOLKS! THIS CERTAINLY IS BETTER THAN HANGING FROM TREE LIMBS!"

This big brown bat was soon tamed and was content to fly about the room and perch on the author's fingers

During the day all the bats remained asleep, hanging upside down on the side or in the corner of the cage. In the evening the smaller ones became active and would fly from one side of the cage to the other. One in particular played a sort of game with himself, crawling repeatedly to the top of the cage for many minutes at a time with no apparent purpose but to drop to the bottom.

There is a considerable difference in the walking habits of the two species. The big brown bat would lie almost flat upon the cage floor and move only with a flappy shuffle, but the small ones would walk quite differently. With their feet thrust beneath them and their tails lifted high the little brown bats used their wrists and thumbs as fore feet and, with elbows akimbo like little props, lifted their bodies well from the surface when they walked. In this manner they were able to move with considerable speed and, though too angular to be graceful, were far from clumsy.

Both species can rise in the air from a flat surface. The little bat, from his walking position, gathers his hind feet under him, and pressing down sharply with his wrists and thumbs, springs lightly into the air. The big brown bat is more clumsy. He lies almost flat and consequently it takes more exertion to lift him. He crouches, partly spreads his wings, and with a push similar to that of the little brown bat, is up and away. He can rise, how-

TENACIOUS AS A BULLDOG

Eating a piece of meat, the bats would refuse to let go although lifted by their teeth

ever, neither as quickly nor as steeply as his smaller cousins. The difference between the two species in beginning their flight may be aptly compared to the take-off of an autogiro and an ordinary airplane.

In the air the larger bat flies much more rapidly than the smaller ones, but indoors he did not appear to have as much skill in avoiding objects, and occasionally struck an electric light cord; but even the large bat was much more adept than a bird, and flew easily under the bed, around the furniture, back and forth from wall to wall, to finally rest on a curtain. One autumn day I released the little bats outdoors. While still in sight one was attacked by a blue jay, but the bat easily evaded him by subtle movements. The bat made no attempt to fly away from his assailant, and their ducking and dodging reminded me of two butterflies flirting in the summer sun. The jay was unable to touch the bat and soon gave up trying to harry such an elusive creature.

My big brown bat continues to thrive. Each evening I take him from his cage and feed him bits of meat from my fingers, after which he exercises by flying around the room. Most of the time, however, he sleeps and occasionally even falls asleep while being fed. Apparently he has resolved to hibernate over the winter, for whenever he finishes eating he begins to look for a place to sleep. It occurred to me to hang a piece of cardboard from the top of the cage about an inch from one side. This screen provides shelter and privacy and the bat invariably hurries behind it as soon as he has been fed, and goes sound asleep upside down.

It is the bat's peculiar fate to have the exaggerated and unenviable fame of being a carrier of multitudes of vermin. My own investigation resulted in finding but one insect on the six bats. After a generous application of insect powder I could detect no more, and I have never even seen them scratch. They are very clean little creatures and persistently wash and comb their fur, a characteristic particularly true of the little brown species. They use their hind feet with their five sharp claws as combs, and go all over their bodies with a rapid combing motion, a process always accompanied by unbelievable contortions.

Once, in an experimental mood, I placed a half-grown mouse with the big brown bat. The rodent was much the more active, and in running and jumping about the cage seemed to pay little attention to the bat. When the mouse came close in front of the bat, the latter, in a defensive attitude, opened his mouth but did not bite. The affair terminated when the mouse curled up and went to sleep on the bat's back while the bat was resting on the floor of the cage.

It is not to our credit that so gentle a creature, and one that has been proved so faithful an ally of man, has so unsavory a reputation.

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Since the dawn of history, pearls have been a source of joy and wonder to the human race. They have been found in the tombs of the Egyptians; in the mounds of the Mound Builders. One of the interesting articles in the June issue of Nature Magazine will be "Abalones and Their Pearls," by La Place Bostwick, well-known authority on Oceanography.

A Place of My Own

By JEAN E. DILWORTH

"ONE DAY I FOUND THE CREEK THAT TUMBLES DOWN THE HILL TO FORM MY RAINBOW."

ACCORDING to old superstition, a pot of gold may be found at the foot of a rainbow. This seems doubtful, particularly in an age when gold is out of circulation, but it was true in this case.

A creek tumbles down a wooded hillside, sending a fine spray into the air. Looking through this spray toward the sun, I found my rainbow, and on the other side the pot of gold . . . a forty acre farm that is crossed through its width by a winding river and through its length by three branches of a creek.

Like Antaeus, I need contact now and then with my Mother, the Earth, that I may have new strength to battle with the herculean task of competing for an existence.

I dreamed from an office chair of a time, indefinite except that it was far in the future, when I would get away from it all, follow my inclinations and have perhaps a few acres with a trout stream, a hill of my own to climb, a plot of my own to cultivate.

The idea began to grow upon me, even though I am a girl, a stenographer, and an individual blessed with a very small amount of money and less time, that it might not be necessary to wait until my hair grayed and my sight dimmed before some of these plans and wishes of mine were fulfilled. Why not do a little living in the present?

Just what then, did I want? A place that I could call my own, where I could go whenever I had a little spare time: something definite to do, something that would give evidence of accomplishment—not to other people, but to myself. Maybe this farm is a hobby. It doesn't matter what we call it. It keeps me busy, interested and happy. Every time I'm there I learn something that I didn't know before. Perhaps I learn simply to connect a bird's song with the right bird. At any rate boredom has completely escaped the realm of my existence. Too many things of interest await every spare moment to allow for boredom. Buying this farm was one act that has never been followed by any pangs of regret, fear or disappointment.

I believe that many people have this desire, along with me, to observe the workings of nature, to indulge in a hobby that calls for being out of doors, and at the same time to build up security against a doubtful future. Most of us cannot afford to throw down our jobs, however despicable and confining, and hie us to the country, there to stir in the dirt because it pleases us, or to lie in the shade of a tree to listen to the songs of birds, and make a study thereof. Stark reality and the necessity to feed and clothe ourselves and our families keep us close to our duties, but even so we can get away now and then, and have some returns for our trouble.

In buying the place I chose to be my own real estate agent, for who should know so well as I what kind of a place I wanted? First, then, I listed the requisite qualities with which my potential farm should be blessed. It must not be far from town, it must have running water, trees, good soil. The cost must be almost negligible. In other words, I must start out with an ordinary barnyard goose and come back with the one that lays golden eggs.

As the location seemed to be the most limiting factor, this was dealt with first. On a soil map of the county I drew a circle with a radius of twenty miles about the city in which I live.

Then within this area I marked all the places that appeared to be located near running water. The soil map, secured from the county agent, gave information, in a general way, as to the kind of soil in the different localities. The assessor's records gave the names of the owners of likely places, and there-

"AND BEHIND THE RAINBOW I FOUND THE POT OF GOLD."

"I DREAMED FROM MY OFFICE CHAIR OF A FEW ACRES WITH A TROUT STREAM"

after information had to be gleaned from the field. I made trip after trip into the country to view what often turned out to be swamps, stump farms, rock piles or beautiful estates that the owners would gladly sell for twenty thousand dollars.

Several times in my disappointment I nearly bought a stump ranch or a swamp (never a twenty thousand dollar estate) but always in time I remembered my objective—not just to buy a farm for the sake of buying it, but to find my ideal farm; the one place that would just suit me. After a year I began to suspect that nothing would suit both my fancy and finances.

Then one day I found the creek that tumbles down the hill and forms my rainbow. But here again disappointment awaited me. The records showed the place to be part of a three hundred and twenty acre farm, most of it valueless. I had no wish (nor the wherewithal) to buy three hundred and twenty acres.

The owner seemed to have to hark back a long way into his memory even to remember that he owned the property. "You mean that old place I took on a mortgage?" Of course I was not familiar with his business, but granted that this might be so—he was a grumpy sort. He seemed startled when I said, "No, just part of it. Forty acres, to be exact."

The fact that I offered him cash shocked him so that he didn't notice how small was the sum I mentioned, and he hustled to prepare a deed while I wrote a check. His anxiety to sell did not indicate that the property was worthless, but rather that, if he had inspected it at all, he had not found, at the far end of his place, at the confluence of creek and river, at least twenty acres of excellent soil, all of which may be irrigated. There were also several acres of trees; birds, beaver, mink, deer and squirrels.

Surely on a place of this kind there would be the seed for a hobby for almost any one who cares at all to study nature. One could have an aquarium, study the habits of birds or of any of the four-footed creatures, experiment with plant life, delve into the private lives of the ant or the bee, cultivate plants for the rock gardens of city folk, become an expert amateur photographer, collect and photograph fungus growths. Each member of a family of ten could have his own private hobby on a place like this.

If I'm threatened once again with that old bogey, unemployment, I can go out to the farm and bring up some of the vegetables from the root cellar and think calmly about where to go next instead of tearing around in a breathless panic.

Did I tell you of the swimming pool—the skating pond? No, in the space of a page or two one can only suggest—indicate—point the way—perhaps whet the appetite of others—who long also for the "place of our own."

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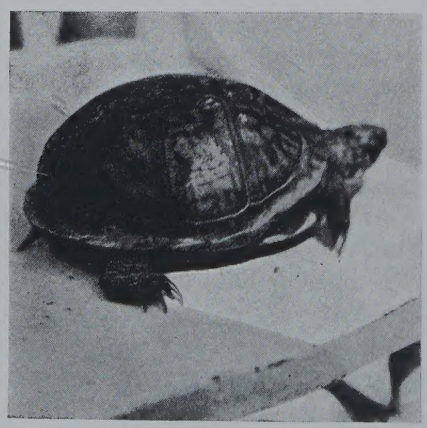
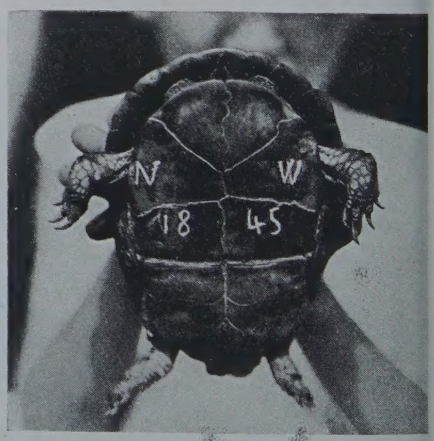


SALT CREEK TOWNSHIP'S OLDEST INHABITANT POSES OBLIGINGLY. PHOTOGRAPHS BY MRS. H. R. BIGGS OF CHANDLERSVILLE, OHIO

AN ANCIENT TORTOISE

THIS old fellow, a box tortoise, is still hale and hearty although he undoubtedly has passed his one hundredth birthday. He was found by Walter Gatewood on his farm in Salt Creek Township, Ohio, June 30, 1935. The initials and date on his under shell were inscribed by Mr. Gatewood's great, great grandfather, Newton Williamson, who lived on the same farm three generations ago.



THE MARKINGS, ALTHOUGH QUITE CLEAR ON THE TURTLE'S SHELL, WERE LINED WITH WHITE INK TO INSURE A SATISFACTORY PICTURE

KNOW YOUR SOIL

By ROMAINE B. WARE

Plants, like humans, require a healthful environment

COURTESY OF THE PEAT IMPORT CORPORATION

EFFECT OF DIFFERENT SOILS ON TOMATOES
Note great variation in root development of plants grown, left to right, in acid sand, building sand, peat, peat sweetened with lime, and ordinary garden soil

I HAVE a flower loving friend who gardens passionately, idolizing every plant and flower in her backyard garden. She pores over the seed catalogs, reads garden books and magazines, but when we talk gardening, almost invariably, the conversation turns to soils.

"What's the matter with my soil?" she asks. "What does it need to prevent it from cracking and drying out so quickly? Why does my clematis seem just to be struggling along when it should be topping the wall? My roses have blooms of richest depth, but that clump of arbutus, so carefully tended, refuses to grow.

"Why do my daphne and most species of *Dianthus* thrive in the limestone ledge of the rock garden while the delightful *Dianthus glacialis* and *neglectus* decline to prosper?"

To all of these questions, the answer is: "Soil conditions". Soil may be just right for one thing but too heavy for others; sufficiently limy to suit some but not acid enough to satisfy another. The variety of soils is legion and each variety divides itself into many grades according to humus content, porosity, alkalinity, and acidity.

Soil is the beginning and end of gardening. Plants spring from the soil, complete their life cycle, decay and become part of the soil once more. Experienced gardeners realize this. One of their first inquiries will be about the nature of the soil. Probably the greatest single cause of disappointment in gardening is failure to understand the limitations of one's soil.

There is wide variation in soil texture. Some are coarse, others fine, some heavy, others light; one type drains like a sieve, others seem as impervious to water as rubber. These differences have a tremendous influence upon the results of the gardener's efforts. Clay that becomes sticky when wet dries out almost as hard as cement. It is frequently of the finest texture. A small thimbleful contains more than 240,000,000,000 particles having a total surface area of about seventy-two square feet. It is apparent that the soil surface exposed to the eye is insignificant compared to that open to the exploring roots of plants.

Sand and gravel, both comparatively coarse, contain little organic matter. Both dry out quickly. Peat soils, on the other extreme, are largely organic and absorb moisture like a sponge. Thoroughly dry peat will hold about seven times its weight of water, in contrast to average garden soil, which holds only about half its own dry weight. It is not surprising that soils well supplied with organic matter do not dry out quickly.

To appreciate what these differences in texture and composition mean, you must realize that all plants exist on a liquid diet. For each pound of dry matter that makes up the actual solids of the plant in your garden, between 500 and 1000 pounds of water must be taken from the soil by the roots. Plant food, from which growth develops, is held in solution in this water and only when so held can the plant utilize it. Air, too, must be present in the soil to supply oxygen; this is another reason why soil must be porous. Tight soils become water soaked and shut out the air. Garden soils, even clay loams, have pore spaces that generally aggregate 30 to 50 percent of the total volume occupied by the soil.

A perfect soil has been described as a blend containing enough clay and humus to retain needed moisture for prevention of drought; enough sand to be porous, thus permitting good drainage and free circulation of air; enough chalk or alkaline substance to offset acidity of the humus, and, in addition, enough plant food elements to sustain growth. When we realize what good soil must contain, the wonder is that our gardens succeed as they do under the various conditions and situations they face.

Today, the degree of soil acidity is recognized as tremendously vital in plant growth. Numerous methods have been devised to measure this factor and multitudinous experiments have developed definite rules applying to the different plants. My friend's clematis failed to thrive because the soil was a bit too acid, a condition remedied with comparative ease by careful addition of lime. Daphne, the charming garden flower, so colorful and gay, together with nearly all the species of *Dianthus,* also demand a sweet soil, one abounding in lime. It has been determined, however, that at least two varieties of *Dianthus—glacialis* and *neglectus*—prefer a slightly acid soil. If yours is a sweet soil and you contemplate growing these along with the others, you'll have to make special pockets for them.

A large majority of garden subjects are quite tolerant in their soil requirements, but others have definite likes and dislikes. Most varieties of the great Rhododendron Family demand an acid soil, as do the members of the Heath Family. Elm and linden trees ask for sweet soils, while chestnut, hickory and Norway spruce prefer acid. Chrysanthemums relish sweet soils, while lupines and platycodon do best in acid locations. We must learn the needs of our plants and regulate the soils to suit them.

Soil testing outfits are available from about a dollar up, or you may take or send samples of soil to your County Agricultural Agent or the State Agricultural College. I have never heard of there being a charge for such tests so there is no reason why you should not learn the conditions of your soil.

The color of the soil is generally indicative of its fertility. Black soils are usually rich because of organic matter in combination with lime. Soils colored brown by organic matter are generally acid. Reddish-brown soils ordinarily result from the presence of organic matter and iron oxide, as are the prized mahogany soils of the south. Light colored or white soils are likely to be lacking in important constituents, usually containing sand with little clay or organic matter necessary to absorb and retain moisture.

"All this is very nice", I can hear you say, "but just what should I do with my soil to get the best results?"

The principal difficulty with most garden soils is lack of organic matter, usually termed "humus". Virgin soils, either prairie or forest, were usually rich in humus, but cultivation and cropping have largely exhausted it. Without humus, heavy or clay soils bake and crack in dry weather or become too sticky to work when wet. Light or sandy soils lacking humus will not retain moisture and may fall prey to erosion. Our problem seems to be the re-establishment of humus in the soil.

The completely planted garden presents a problem in this respect, but one that is not insurmountable. Humus in various forms is available and may be worked into the soil around and between the plants. When the garden receives its periodic re-building, which all gardens deserve if they are to remain productive, humus may be spaded in. Vacant land, if lacking organic matter, can be planted to a cover crop that may be turned under green. Rye, vetch and soy beans are used for this purpose.

Peat moss has been a boon to countless gardens but it is inclined to increase acidity. Application of lime will offset this and aid in liberating the food elements locked up in the soil. Be sure to use finely pulverized peat, especially prepared for horticultural use.

Leaf mold and numerous commercial forms of humus are readily available at reasonable prices or you can produce your own leafmold by composting leaves gathered in the fall.

No place is too small for a compost heap. It is your factory for manufacturing good soil. Compost may consist of leaves, vegetable matter and turf piled up and turned over two or three times a season to speed decomposition and to mix the elements. About a year is needed to "manufacture" this soil but it is more than worth it in the results obtained. A liberal addition of lime to the heap will hasten decomposition and make the resulting compost less acid.

Humus should be added to very heavy and very light soils. Heavy soils and those with so-called "hardpan" underlying them must receive extra attention to insure drainage. Humus will break up the surface layer, but unless subsurface drainage is assured, the soil will become waterlogged in wet weather and the majority of plants will fail to thrive. Frequently it is necessary to lay open-joint drain tile to carry off surplus water.

Heavy clay soils may be lightened by spading sand, wood ashes, sifted coal or coke ashes into them. These, however, can not be expected to have the beneficial effect of humus. A combination of both organic matter and sand or ashes is best. Lime, while it is not a plant food, aids in making the food elements in the soil more easily available. It unlocks the doors of the food storehouse. Lime makes heavy soils lighter and tends to tie together light soils.

Bacteria, those invisible entities that play such a large rôle in the world, are intensely active in the soil at and near the surface. They too, unlock the vaults that hold food for our plants. The soil is a veritable beehive of activity as these friendly "bugs" carry on their work. Bacteria function best in soil well supplied with organic matter and find existence uncertain in soil lacking this vital requisite.

The subject of plant food can not be covered here. If, however, the soil is open and drains well, and at the same time contains humus to help it retain needed moisture, the food problem is greatly simplified.

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"LITTLE WATERS: THEIR RELATION TO THE LAND"

IN this attractive booklet, issued jointly by the Soil Conservation Service, the Resettlement Administration, and the Rural Electrification Administration, the authors elaborate on the conditions that have led to the deterioration or destruction of vast areas in the United States, largely because of the unwise use of both wet and dry lands, and the mismanagement of watershed areas. There is little that is new in the book, but apparently it is the first publication of the government that gives a clear presentation of the whole picture. We recognize here and there what we believe are the first instances of government recognition of plans and principles whose adoption has been urged for years by scientists eminent in the fields of biology and conservation; these people have previously been able to publish only in scientific journals of limited circulation. We trust that these students will now receive credit for their patient industry, and that their recommendations will bear fruit. E. A. P.

"Old Toxico"

Poison Ivy goes under the microscope

By NATHAN C. JOHNSON

THE TWO FORMS OF POISON IVY LEAVES
No matter what the shape or texture of the leaves, remember the old adage: "Leaves three, turn and flee."

SPRING, bringing with her the hiking and picnicking season, is here, and, as usual, a great many persons again will become afflicted with that bane of the outdoor lover's existence, poison ivy.

This plant, along with its pestiferous relatives, poison oak and poison sumac, all belonging to the genus *Rhus,* is a foe of nearly every youngster who walks barelegged through the woods. Some forgotten realist has said: "Nature made poison ivy the day after she finished making the louse, the mosquito and the flea."

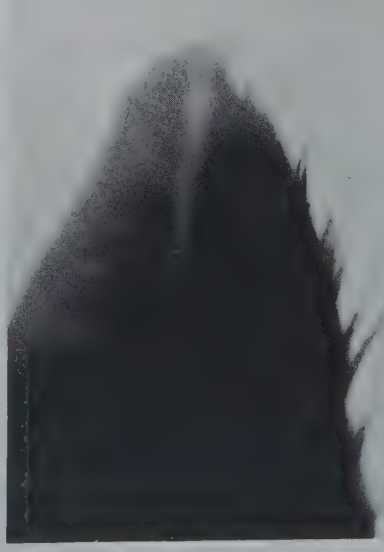
As can be seen by the micro-photographs, the "fangs" of a poison ivy leaf appear anything but hospitable. These fangs are hollow tubes through which flow the liquid that causes so much annoyance to those who come in contact with it. No other plant, so far as I know, possesses such weapons to deliver unwholesome juices to its enemies. A snake has fangs to use if attacked. A nettle has spines to protect it from being eaten. Poison ivy is so resentful of any disturbance, however, that touching a growing ivy plant with a broom straw will bring a flood of poison instantly, not only to the portion touched, but to points as distant as three inches away.

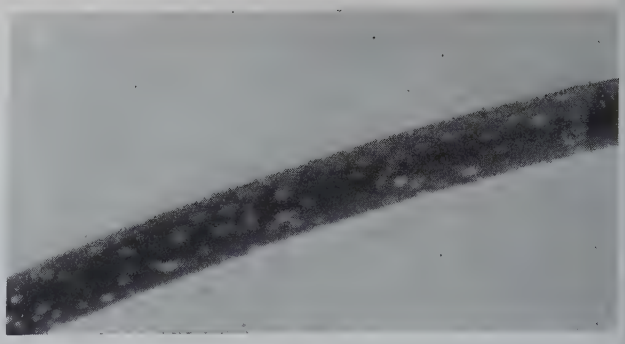
The psychoanalysis of "Old Toxico" (the Latin name is *Rhus toxicodendron*) required a great deal of patient and persistent study. The problem was first attacked in the winter time, when Toxico's activities were expected to be dormant. To the amusement of neighbors who suspected insanity, a specimen was dug up from under a couple of feet of snow and the roots were dusted off. Result: Toxico bit and bit hard!

It was not then known that the plant had fangs and that its roots were more dangerous in winter than at any other time. However, as a result-getting project, the little winter expedition was a success. Then began the attempt to tame Toxico. Potted carefully, this time with rubber gloves, the plant was given a warm southern exposure for an initial kindness. As I thoughtlessly patted its apparently harmless bark one day, long before any buds or sprouts had shown, Toxico bit again. Another discovery! Even the bark of this vicious plant was equipped with poison ducts.

No detailed chronicle of this long investigation will be attempted here. Suffice it to say that: first, roots, vines, stems, leaves and dead vines, pulled from trees and from the ground, were treated in various ways to extract the poison and the sap. Second, it was found that the poison-

BEFORE AND AFTER
At left, an undisturbed ivy leaf awaits a victim. At right, the leaf has been irritated with a broom straw. Note how the 47-second exposure has been blurred as the "fangs" reach toward the irritation and eject their poison. Both pictures magnified 60 diameters





EVEN THE STEMS ARE DANGEROUS

Magnified four diameters, this photograph shows the "eyes" of the stem. When this is touched, the minute holes exude the same poison as do the "fangs."

sap is not the nourishing-sap. The latter will discolor in air, while the former, coming through the fangs on the leaves, the "eyes" on the stems, through the bark and the covering on the roots, does not so darken, but remains clear and is invisible on the skin. This is one of its dangers. Third, the poison sap carries, in minute suspension, an oil that resists most solvents, responding fully to one chemical only. This irritating oil is absorbed by the human skin very readily, but is not absorbed by the skin of other animals, such as the dog, the cat, the rabbit, and the squirrel, with which the poison was brought into contact experimentally. Fourth, the vapors of the poison sap and the poison oil in it do not pass off at the temperature of boiling water but do pass off and are poisonous in the extreme somewhere beyond that temperature. When burning the spring trash pile, or burning over land that has ivy on it, beware, then, lest the smoke gets in your eyes! Air-borne pollen also is poisonous.

It was interesting also to find that Toxico's venom was not unlike rattlesnake venom, though in a very mild way, in that it is nerve destroying. Such destruction of human tissue of course brings other toxins into being, creating seemingly endless distresses.

Although Toxico has hollow fangs as shown in the photograph, no evidence was found that these fangs penetrate the human skin as do snakes' fangs, or nettles. They seem only to be a means of dropping the venom on the victim's body. It may also be of interest to say that pure ivy venom, up to perhaps 2000 times Toxico's normal strength, was extracted for purposes of study. The writer vaccinated his arm with this concentrate for purposes of experiment, and although something was then known about controlling the infection, not enough had been learned at that time to prevent the dose from breaking out, even around the finger nails.

But good came of it all, for this temporary failure resulted in the evolution of a safe and effective way to control ivy poisoning, as well as that of poison "oak" and of poison sumac. It was found that not one of the substances commonly recommended as remedies, including the much publicized iron chloride, had any effect on the poison sap that carries the penetrating oil. On the other hand, nearly all these old-timers had effect on the nourishing sap. These two saps seem to be different things, and seem to be piped separately from the plant. Perhaps clinical students previously have been misled as to remedies through failure to distinguish between these two distinct and different substances.

With the coming of warmer weather, when many scouting, camping and motoring parties are spending their time in the open, it would be wise to take the following precautions: Familiarize yourself with Toxico's appearance. Three leaves always, sometimes glistening, sometimes dull. Remember the name "Toxico", for toxic means poisonous. Treat this plant with respect. Keep away from it! If you feel a burn or sting and see something like a red scratch on your arm, or a spot or series of spots, as a temporary first-aid wash the area with strong washing powder as soon as possible. Yellow soap is commonly recommended, but washing powder is much better. Do not worry if the powder stings. A little sting is better than a long burn.

Wash your hands frequently with this powder if near ivy. A frequent gesture is rubbing the eyes or running a finger around the collar. The skin of the hands being tough, ivy poison may be on it and not be felt, but it is easily distributed to other parts of the body by this means. If you have contracted ivy poisoning do not apply grease, lanolin, oil, cold cream, iodine or alcohol. These spread infection. Avoid "remedies" containing grease—they do more harm than good. Rhus poisoning, with its "susceptibles" and "immunes", is now suspected of being a form of allergy.

When an infection has really started, get information as speedily as possible on how to adequately treat the poisoning. Avoid sugar of lead and its commercial mixtures, for they do no good and are poisonous of themselves. If badly infected, don't fail to see a doctor, for Old Toxico can be really dangerous and is justly to be feared by young and old alike.

ERECT "FANGS" ON AN IRRITATED LEAF

Farthest to the left, at the tip of the weapon, can be seen a drop of poison

ANTEATER

ARMADILLO

TURKIN

LAMB

ALLIGATOR

The Bugazoo

By YVONNE McCANDLESS

Photographs by Kenneth McCandless

"WHAT in the world is a Bugazoo?" you will ask. "We made it," members of the Floradel Junior Garden Club might reply, and they might add, "We won a prize for it at the National Flower Show, too."

This "Zoo," as you can see from the photographs, was made from seed pods, seeds, tendrils, leaves and other plant whatnots. Although the Bugazoo has been three years in the making, interest in it is still much alive and new "creatures" are added as they are "captured" in the land of imagination and the great outdoors. When the quiet-spoken leader of the group, Mrs. Ema E. Trude, was asked how the Bugazoo idea came about, she replied: "Oh, we found a martynia pod one day that looked much like a monkey's body and tail, so we found an acorn head for him, some sticks for hands and feet, some seeds for ears and eyes, and there he was, just as cute as he could be.

"This started the children off and soon they were seeing animals, bugs and birds in a great many things. They all worked together at this project. One might happen to find a seed pod shaped like a rabbit and someone else might supply the leaves, and so forth, that were necessary for ears and tail. The fun of creating the 'Zoo' seemed to supersede the thirst for individual glory.

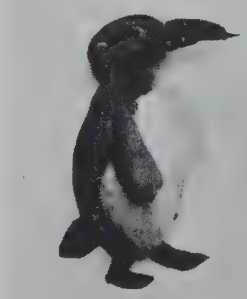
"Thus the children not only were learning cooperation through this project, but they were having fun and becoming much more alert and observant. Not the least of their delights was verifying their Bugazoo creations with authoritative texts and pictures."

But much credit for the creativeness of this group of young Nature students must go to Mrs. Trude, who, without asking for attention or reward, is helping to build in these children a lovely spirit that will make their senses always alert for the fun, the beauty, and the harmony about them. Here's how the creatures of this Bugazoo were made:

Armadillo: Body, small cone; legs and tail, bare twigs of spruce; ears, small zinnia seeds; round black seeds for eyes.

Turkin: Body, one half of cone; tail, pampas grass after seeds have blown off; neck, the partition out of a trumpet vine pod; head, part of a gladiolus pod; comb, part of a seed

PEGAU



PENGUIN

MONKEY

KATYDID

MOUSE

pod notched and painted red; eye, small flat seeds; legs, taken from clematis vine.

Anteater: Body, part of the outer husk of a buck-eye with rough surface smoothed down; head, gladiolus seed pod; small seeds for eyes.

Lamb: Body, part of the outer husk of a buck-eye; legs, pieces of trumpet vine pod; tail, twisted twig; head, one half of small acorn; partridge berry seed pods for ears.

Katydid: Body, part of gladiolus seed pod painted green; legs from a teasel pod; head, a split pea.

Monkey: Body and tail, one half martynia pod; head, one half acorn; ears, hollyhock seeds; eyes, seed of mallow; legs, pieces of dried canna bulb or tuber.

Alligator: Made of pieces of the outer covering of the buck-eye; eyes, blackberry or lily seeds.

Pegau: Body, one half hickory nut; head, part of the pod of the trumpet vine pod; tail, same. Feet are tendrils of clematis; eye, blackberry lily seed; tail, part of the trumpet vine seed pod. He is perched on part of a dried canna tuber or bulb.

THE BUGAZOO PEACOCK

Penguin: Body, one half hickory nut; wing, pine cone, tail, same. Feet, partridge pea pods; head, lichee nut; bill, part of a mallow marvel pod; flat seed for eye.

June beetle: Body, one half buck-eye; legs, pieces of same; head, part of buck-eye; eyes, blackberry lily seeds.

Mouse: One half almond with regal lily seeds for ears, radish seed for eye, bare spruce twig legs, whiskers of pampas grass seed.

Butterfly: Maple seeds, curled leaf, dried seed pod, grass for antennae.

Peacock: Milkweed pod, catkin, weed stalks, pampas grass with fluff pulled off, hollyhock seeds.

THE BUGAZOO BUTTERFLY SEES A TASTY MORSEL ON THE BUGAZOO BUSH

Mountain Flowering Raspberry

By ETHEL MARY BAKER

WERE it not for the shrubs that droop so gracefully about the sharp-edged rocks and band themselves together in friendly and attractive groups on steep, bare hillsides, our mountains would look desolate indeed. While there are many mountain shrubs of many species, perhaps the most outstanding of them all, especially when in full bloom, is the Rocky Mountain flowering raspberry, locally called thimbleberry, *Rubus deliciosus.*

This is one of the brambles that has no thorns, and the large four- or five-petaled flowers of snowy-white resemble nothing quite so much as single roses. In May and June, depending much upon the altitude where they are growing, they pop out in profusion all along the slender, willowy stems, a striking contrast to the bright green of the pretty lobed leaves. This shrub does not confine itself to gravelly slopes, but wedges in between the rocks that border rushing streams, the blossom-laden sprays often tumbling downward almost to the water's edge. The thimbleberry is one wildling that tames very readily, and just as fine specimens may be found growing in gardens as in their native habitat.

Yellowstone National Park is a place of surprises, ranging from the constancy of Old Faithful to the ubiquitous black bears. Here is one of Yellowstone's fairyland terraces formed from the overflow from hot, mineral water pools. Union Pacific Photograph.

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OUT WHERE THE WEST BEGINS

Mountains hold a lure for perhaps more people than seashore, lake or gently rolling countryside. There is an exhilaration in heights; a nobility in the towering masses of our Western peaks and ranges. There we have wisely set aside several National Parks as great national playgrounds, preserving for coming generations these splendid scenic areas, within whose borders are marvels of Nature's making that should not be marred. To know these regions is a rare opportunity.

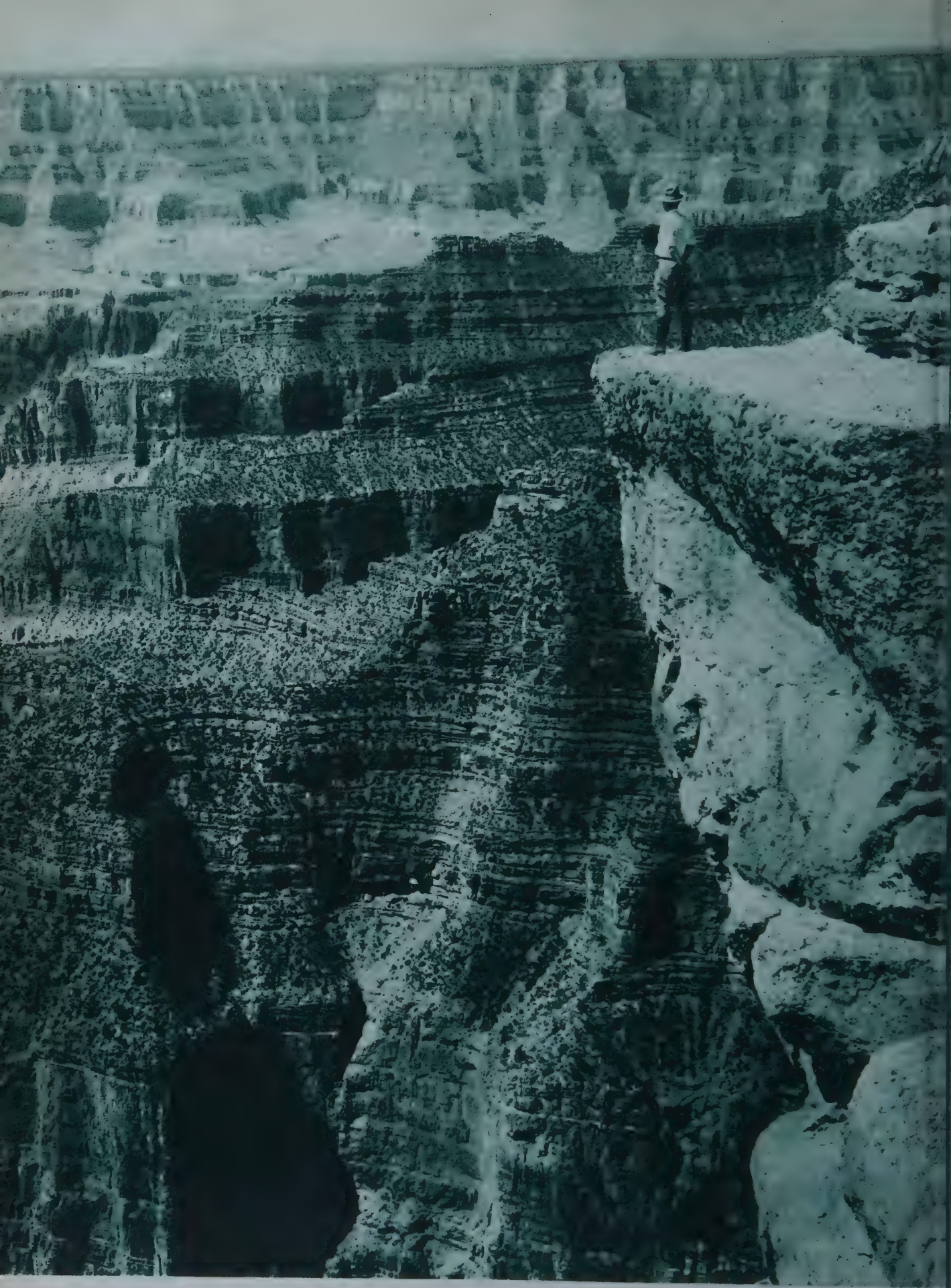
The standard of our National Parks has been high. It should be kept so. To lower it would be to reflect upon such great areas as the Yellowstone, Glacier, Yosemite, the Grand Canyon, Crater Lake, the Tetons and Mount Rainier. Serving the purposes of recreation and preservation of animal and plant life, National Parks should always be worthy of such high endeavors.

Last year, with the improvement in economic conditions, many thousands visited our National Parks. More will visit them this year. These travelers will, inevitably, carry back from the summer's vacation an increased appreciation of the glories that are America's. And to the north they will find that a wise Canadian Government has comparable areas in Jasper and Waterton, and the region of Banff and Lake Louise.

A view of Going-to-the-Sun Mountain from Logan Pass in Glacier National Park is something to be remembered. This peak is now seen from the new highway. Photograph from the Great Northern.

The more hardy visitors are repaid by a pack trip into the Tonquin Valley of Jasper National Park, there to camp at the base of Mount Redoubt and the Ramparts. Photograph from the Canadian National.

Yosemite National Park is rich in varied scenic splendors such as this view with Half Dome visible in the middle distance. Union Pacific Photograph.



From Bright Angel Point on the North Rim of the Grand Canyon the visitor looks seventeen miles across the massive chasm of the Colorado River to the South Rim. Union Pacific Photograph.

Grand Teton, majestic peak of the Teton Range, Grand Teton National Park, is known as the "King of the American Alps". Rearing 13,747 feet into the clouds, its feet are bathed in the waters of Jenny Lake. Union Pacific Photograph.

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Atop the Beartooth Mountains of Montana lies Star Lake, its clear waters reflecting the rugged beauty of its alpine setting. Photograph courtesy of the Northern Pacific Railway.

The entrance to Rocky Mountain National Park, Colorado, is typical of the entrances to all of our National Parks. There are a thrill of possession and a sense of gratitude to those who conceived the National Park System as one passes within the boundaries. Here the Park entrance gives a rustic frame to a setting worthy of a painting by Maxfield Parrish. Photograph from the Union Pacific.

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Although Mount Hood, Oregon, is not a National Park it draws visitors from far and wide and is the center of a considerable recreational area. This beautiful peak, here viewed from Lost Lake, is the goal of many hikers and mountain climbers. Much of its charm lies in its solitary splendor. Photograph from Gifford Studios.

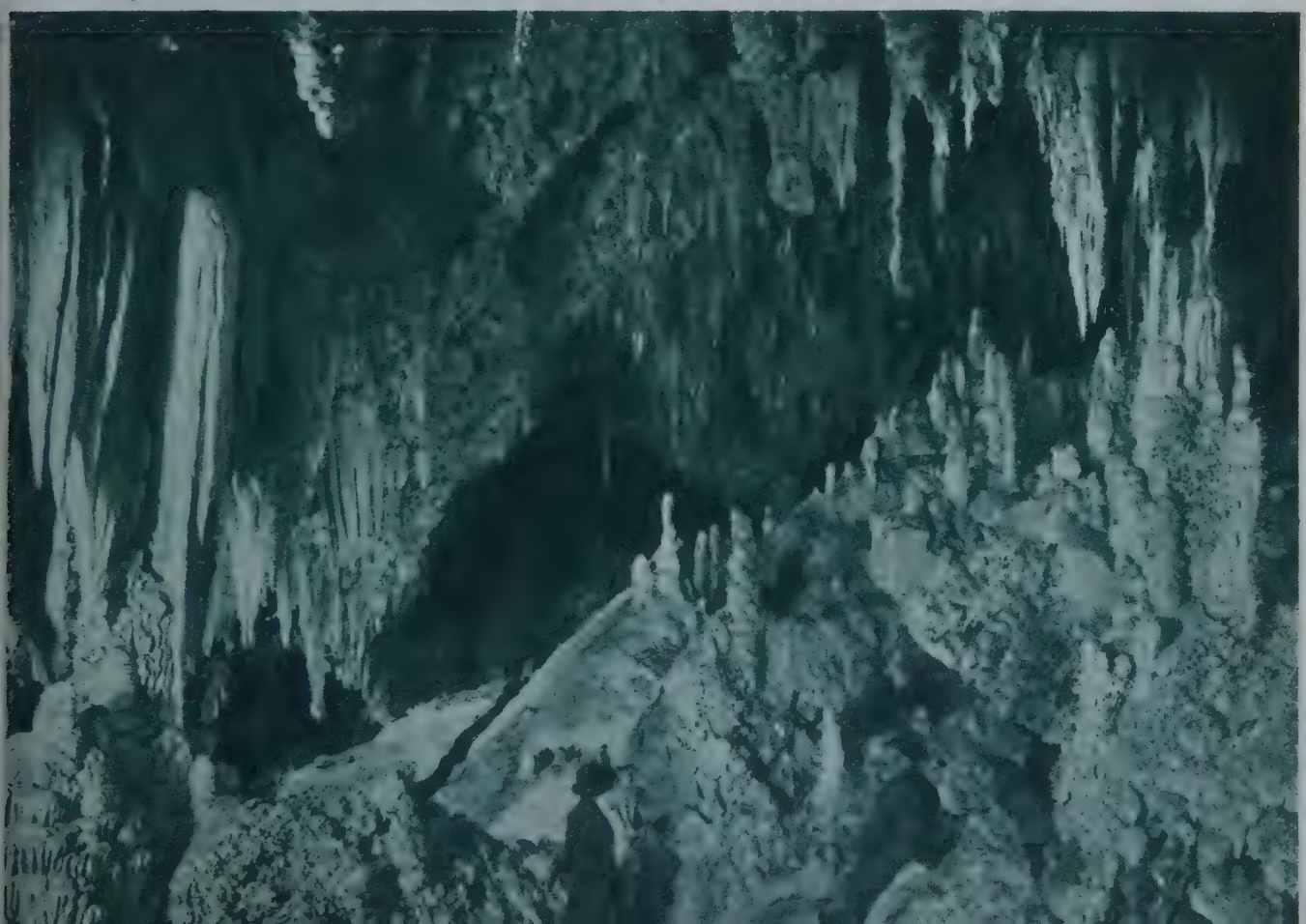
Development of trails in National Park areas has resulted in greater hiking activity. An active organization has been formed concentrating on hikes in the Canadian Rockies in the vicinity of Banff and Lake Louise. Here two members of the big Skyline Trail Hike of last year pause to drink in the view from the height above Yoho Valley. Photograph courtesy of the Canadian Pacific Railroad.

Alaska is attracting more and more lovers of the mountains every year. One of the many beautiful spots on the Alaskan trip in the region of Skagway, gateway to the Yukon and the Klondike, nestling in a sheltered spot among towering, snow-capped mountains. From here one may visit Lake Atlin and other inland beauty spots.

Nature's amazing sculptures in Bryce Canyon National Park provide endless fascination. It is a fantastic yet beautiful region. Photograph by the Union Pacific.

Crater Lake, Oregon, is noted for the beauty of its color and setting. Another interesting feature of the lake is its phantom ship of rock. Union Pacific Photograph.

The fascinating and only partly revealed story of a bygone people is told in the pueblo ruins on the steep cliffs in Mesa Verde National Park. Although slightly off the beaten track, the charm and interest of this Park are rapidly becoming known and the number of the annual visitors increases. Here we look down on the ruins of Spruce Tree House, one of the larger of the ruins in the Park area. Another southwestern National Park is Carlsbad Cavern, a visit to which means an introduction to the one of the most splendid of all caves. We see here the myriad formations in the King's Chamber. Photographs courtesy of the Atchison, Topeka and Santa Fe.



Springtime is everywhere a season of beauty; of new life; of Nature awakening many of her children to a new or renewed beauty. The charm of Spring knows no national boundaries, being subservient only to the sun in its orderly course. The beauty of Spring seems perfectly exemplified in the lovely blossoms against a background of white-crowned mountains at Locarno, Switzerland's sub-tropical paradise. Photograph by E. Steinemann. Many are the Swiss wild flowers that early greet the coming of the new season. Among this legion is the furry anemone, a lovely alpine flower found in profusion in the Bernese Oberland. Photograph by A. Klopfenstein.

THE NATURE PICTURE OF THE MONTH

This picture by Lorene Squire of Harper, Kansas, was selected by the judges because it contains drama and carries a lesson. Cats improperly fed or left to shift for themselves without homes naturally become predators and enemies of bird life.

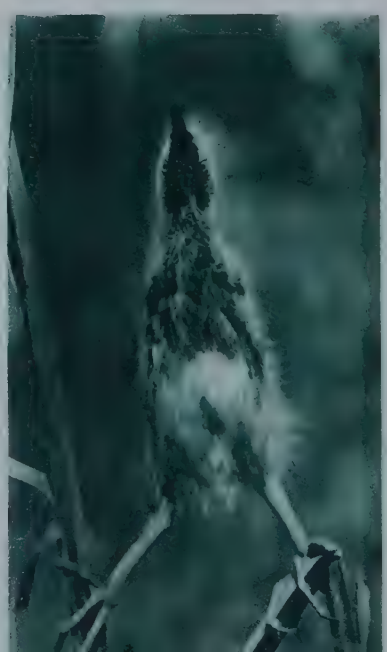
May means nesting time and family cares to many of our song-birds. The pictures on this and the next two pages were selected for special award in the Rotogravure Contest.

The two parent kingbirds perched on the edge of their nest seem to be discussing some family problem, perhaps of discipline or the proper feeding of the infants. They were photographed thus by Raymond S. Deck of Pelham, New York.

Walter Heyderhoff of Camillus, New York, obtained the two pictures of the tree swallow first roosting at the house entrance and then springing away on fast-beating wings. He used a Voightlander camera.

The young bittern clinging somewhat precariously and, perhaps, uncomfortably to its perch was photographed by Harold M. Holland of Galesburg, Illinois, using an Auto Graflex.

The picture on the opposite page is the work of Storrs H. Lyman of Dayton, Washington, who used an Eastman Kodak. Two young sparrow hawks pose calmly with the result that the picture might have come from the pen of a bird artist.



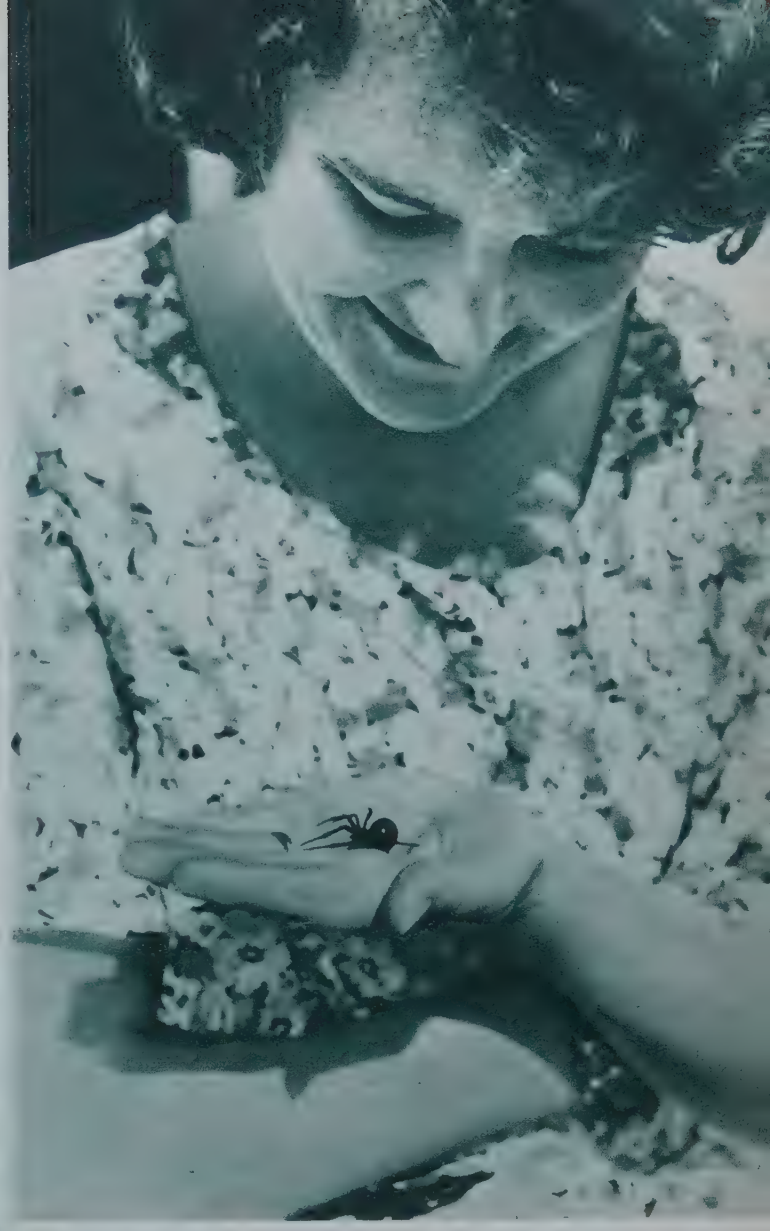
Mother Hummingbird sits quietly on her two tiny eggs in her little nest, the size and weight of which are graphically indicated by its position on the branch. Photographed by Rachael Decker, Parshall, Colorado, using a Kodak and a photoflash bulb.

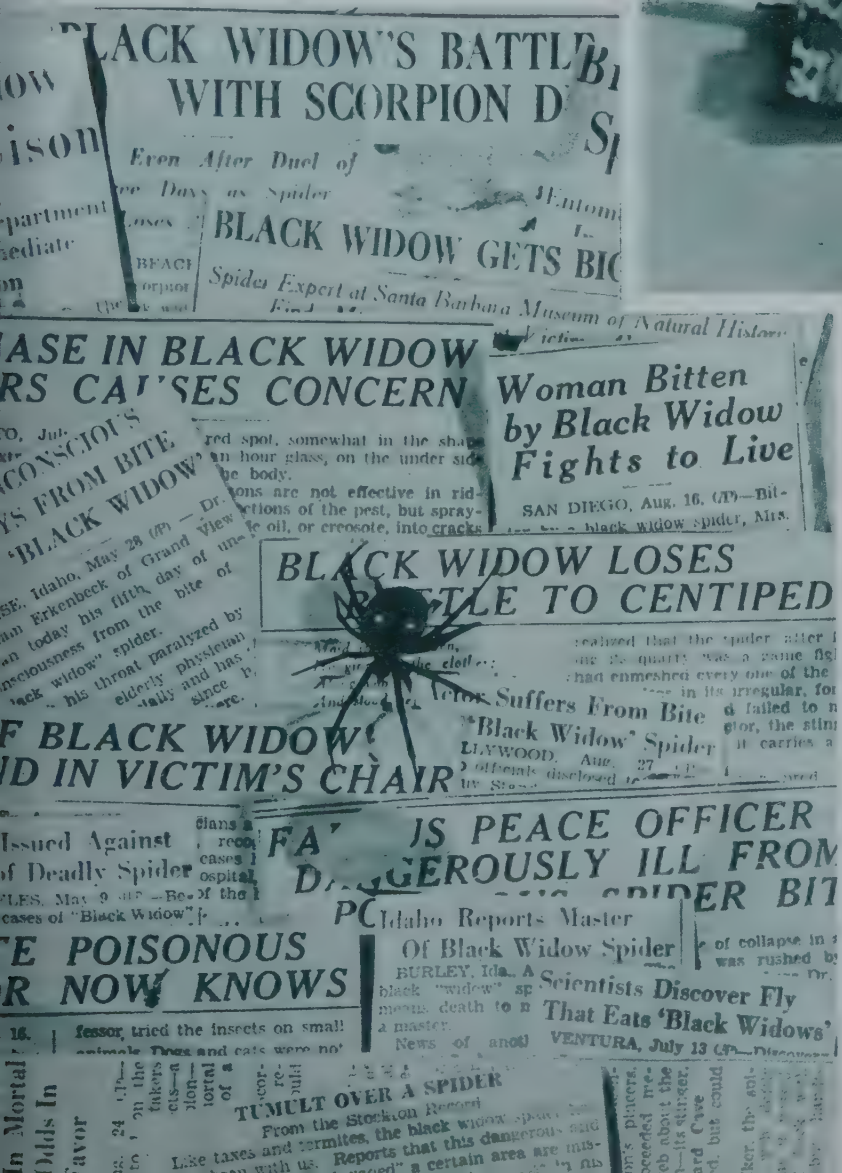
A female Brewer blackbird insisted on roosting on the window sash and refused to go away, so Mary Davidson of Fort Jones, California, used her Pocket Kodak to record the fact. A pigmy nuthatch posing on a stump was expertly photographed by Ruth and Harry Crockett, Phoenix, Arizona, with their Zeiss Trona.

The Black Widow

Probably more headlines have been given to the black widow than any other insect. To be sure, the Japanese beetle, the Mediterranean fruit fly and other insects that cause economic damage have had their share. But the black widow has a spectacular common name and an evil reputation.

There is no question that this spider is poisonous and may be fatally so. Nevertheless, more hysterical attention has been devoted to it than is really warranted by the facts. The result of publicity has been to convey the impression that the black widow seeks out human beings just for the joy of biting them. This is not proved by the evidence. In fact, scientists and others have found it difficult to make this spider bite them. It seems always to be a most peacefully-minded fellow resorting to the use of its dangerous bite only when frightened or cornered and goaded to defence.





To be sure, it may be so frightened by accident and the result may be painful or worse. So look out for a black spider about one-half inch in length with fairly long and slender front and hind legs and a red spot shaped like an hour glass on the under side of its abdomen. It is widespread in its range and it is known by many popular names, of which black widow is the most used. It is known to science as *Lathrodectus mactans*.

One Way to "Get Your Buck"

By STUART M. CHAMBERS

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With the Nature photographer it is often the chance shot for which no plan has been made that turns out to be the best and most interesting. I was camping one May in the California Sierra and started out one morning armed with my camera and telephoto lens. All I had in mind was to get a picture of mountain scenery in the slanting morning light. At a turn in the trail I saw, not far ahead, a young buck mule deer. He was calmly grazing at the edge of a little clearing, his velvet antlers shimmering in the sunlight.

There was just time to turn my lens toward him before he sensed my presence with that alertness of the wild that makes camera hunting a real art. For a split second the buck posed beautifully, but it was just long enough for me to get my first shot and quickly get ready for whatever other chance should remain for me.

With one startled leap the deer was in the brush, but his curiosity got the best of him. This human animal had not shot at him. That was strange. So for a moment he paused to look back, his whole expression one of tense questioning and wonderment. The camera caught it all before he disappeared. That is how I "got my buck".

★ Conservation ★

A section of Nature Magazine devoted each month to the expression of practical opinions on the vital issues affecting our use and abuse of natural resources, including wildlife, and dedicated to the purpose of assisting Americans to play a militant part in the attainment of constructive conservation aims.

ARTHUR NEWTON PACK, *Editor*

A TWO-YEAR CLOSED SEASON

In addition to the ordinary hazards of Nature that waterfowl have undergone since they first inhabited the marshes of North America, they have suffered unduly from the results of various slogans. In its original meaning, a slogan was a war cry that summoned the clans for common defense. But the slogans for waterfowl defense have always been so intoned that they summoned enemies in greater numbers than friends. Pass the Shooting Grounds Bill; Count the Ducks; Adopt the Shell-Tax; Pass the Duck Stamp Bill; Buy a Duck Stamp; More Game Birds in America; Join the Wildfowlers; Swat the Crow; Kill the Turtles; Ducks for a Dollar; Eat Your Cake and Have It Too; Baiting is Feeding; Raise more Ducks; Enroll more Hunters; and so on, *ad nauseam*. But, never, "Stop Killing".

While the activities connotated by these more or less harmless examples of words run their courses or otherwise die, the waterfowl are steadily growing fewer and fewer. Not that some of these activities are without merit, but because each has been accompanied by another: The Game's Best Friend is the Hunter. As a consequence the ducks and geese are still forced, in spite of dwindling numbers, to furnish sport sufficient to support a business in arms, ammunition and other accessories that yields hundreds of millions of dollars annually. The game species of America have borne this burden for many years, but they are now vanishing from our country.

It is not within the scope of this article to discuss in detail the events of long ago, but only of the immediate past, and their relation to the future. The Bureau that is charged with the protection of the migratory birds is the Biological Survey; a couple of years ago its chief declared that the greatest enemies of our wildlife are the Democrats and the Republicans. A similar observation was made several years ago, but in neither case did the author choose to mention the particular persons he had in mind. We could name a lot of them, but we are not using names in this article. Perhaps the chief meant that politics is the birds' greatest enemy. If so, he was entirely right. As a matter of fact his acceptance of the office of chief, although we believe he did not realize it, was the result of politics. It is pretty plain, and much to his credit, that he did not understand the game of politics, or did not care to play it. So, after a stormy siege, he resigned.

But one of the results of his short administration was another slogan: "Put Wildlife on a Bookkeeping Basis". And how eagerly the destroyers welcomed that new one! Waterfowl were recognized as the basis of an industry.

Among the necessary requisites for keeping books is a capital stock of known value, some control of the outgo, and a measure of the income. Bookkeeping in a chicken business is possible, for the stock costs so much, the increase is planned and protected; a part can be used or sold; the income can be measured. But, as the more intelligent among both destroyers and conservationists have long known, none of these factors are known in the case of the waterfowl. The stock has been planted and cared for by Nature. The gunners have merely reaped, and have not even made an accounting of their take. They "robbed the roost" at night, pretended to chase the thieves by day, lied about the increase, and made no attempt to report the kill. The waterfowl were theirs; Uncle Sam was keeping the books. Why worry?

And Uncle told the gunners, in effect, "Sure, you can kill 300 ducks in a season, if you can find them. A license will cost three or four dollars. One dollar of your money must go for refuges; and a half a dollar for seeing that you play fair. The rest is needed for bookkeeping. Now run along, sonny, and good luck."

So in the spring of 1934 the Survey announced that, although it had been accumulating basic facts for a long period, it was going after more. Some of the information already known was expressed in a series of maps and statements, showing breeding ranges of twenty-four important species of ducks and geese, and the country over which they were shot for sport. Later this information appeared in a bulletin. Data on which the kill would be based were promised. Americans had long been shooting ducks without knowing how many there were. We must find out, and base the kill on the stock in hand.

But the open season allowed that autumn was liberal

beyond the hopes of the most sanguine of the sportsmen, for although there were only thirty shooting days, these were spread so as to allow for the fullest utilization of baiting and rest-days, both practices admittedly destructive. There should have been a closed season—*But.* But, what? Unnamed Democrats and Republicans. Result: More reduction of breeding stock. Too late, the direful results of this program were realized.

Bear in mind that for several years it had been generally admitted, even by the sportsmen, that the waterfowl were steadily decreasing; that several species were in a dangerous condition; that the United States breeding grounds, already depleted by settlement and drainage, were now virtually destroyed by drought; that even the vast virgin breeding grounds of Canada and Alaska were pitifully deficient in breeding stock; that current methods of shooting, even allowing for restrictions, were still frightfully destructive; that each year more birds were killed than were raised.

Then the waterfowl count of early 1935. It happened at a time when weather conditions were unfavorable. Result: None of any consequence. Later there were a lot of more or less official estimates of waterfowl population that ranged from about twenty-four millions up to about sixty millions for North America. But one prominent waterfowl counter brazenly admitted that one man's guess is as good as another's. Bookkeeping, *huh!*

As the time approached when the seasonal persecution of the waterfowl must be planned there developed a demand for a closed season from several organizations of nation-wide representation, from a few state game commissions, and from one midwest organization representing more than a quarter of a million people, including the membership of about a hundred sportsmen's clubs. No reaction by the Department to this reasonable request.

The Federal regulations did forbid baiting and allowed thirty days waterfowl shooting in each of two zones; thirty days for the resident hunter, but sixty days for the migratory duck and the mobile hunter. Many complaints of poor bags, but no figures of kill for the 1935 season.

What do the books show now? Well, there was another waterfowl count covering three days, January 24-26, 1936. We have seen no report on this except a mimeographed radio speech. This indicates that even the bookkeepers take it as a joke. We are told that there were five summer expeditions to Canadian breeding grounds. This vast area was found to harbor somewhere between a tenth and a fifth of the duck population it is capable of carrying, "But with true scientific caution the investigators concluded that there should be an increase". There are other "encouraging" reports. Then is discussed the job of organizing eight field "armies" and a couple of "navies" to do the January counting. This leads to an expression of sympathy for Marshal Foch when he was closing up the World War. The only tangible statement we glean from the account is that we have more waterfowl than we had a year ago. (But as we do not know this number we cannot feel encouraged, especially in view of the official statement that for the past five years more waterfowl have been killed than have been raised.) Shades of J—— K——! Two pages of such nonsense, and nothing about the status of the disappearing Ross Goose, from its winter range in California; nothing about the fact that over large areas, the coots, which have not been shot, now number nearly as many as all the duck species combined; nothing about the pitiful numbers of ducks actually seen.

We think it is high time that all this silly stuff about "bookkeeping" be abandoned. With all due respect to the efforts of the Survey to improve our United States breeding grounds, let us not forget that they can never benefit more than fifteen percent of North American waterfowl. We know that vast areas in the north are in primitive condition as breeding grounds, but lack breeding stock. Why do we not stop listening to politicians—Democrats, Republicans, Independents, Socialists and all the rest—and begin restoring our waterfowl resources by the only means possible—by stopping the killing for at least two years? By that time we would know whether waterfowl shooting could be resumed. If the waterfowl are exterminated, what will the guns have to work on?

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GET BUSY FOR WILDLIFE

From its offices in the investment building, Washington, D.C., the General Wildlife Federation has issued a pamphlet: *A Suggested Plan and Information for Use in the Formation of County and State Wildlife Federations.* It is signed by J. N. Darling, acting president.

"The object of this Federation", the pamphlet states, "will be to keep the individuals informed of the needs, crises and information relative to governmental activities or lack of them in the field of conservation and thereby enable the voter to intelligently register his opinion with the designated official.

"There are enough wildlife enthusiasts in any county in the United States to affect the most disinterested official. *** The sole purpose of this Federation is to get word down to the voters and have them do the speaking directly to our elected officials of government."

There is a lack of machinery in the Federation, as now constituted, evident in this pamphlet, and elsewhere, to bring its aims to the attention of people interested in wildlife species as important entities in our fauna, rather than as game. We refer especially to "Garden and Women's clubs, Audubon Societies, Farm Groups, and others," thus listed by the Federation. The various groups interested in game are already well informed.

As an aid in translating wishes into action, The American Nature Association therefore urges everyone to send to the federation lists of names, preferably members of organizations, who wish to save birds and mammals, and to write for this pamphlet; to attend the county and state organization meetings; *and, especially,* to write to their state and national representatives urging immediate action along clear cut lines to preserve our vanishing wild creatures.

The Case for The Ducks

By LOUIS T. McKIM

AFTER all that has been written about the dire plight of our ducks, the testimony of a man from Saskatchewan seems hardly necessary to make out a case, but perhaps some readers of Nature Magazine may be interested in the view of an observer who hails from where the birds are grown. For, say, half a century, not to be too definite about it, I have lived in the center of what was once the greatest duck breeding ground in North America, perhaps in the whole world. The lakes and sloughs strewn so plentifully over the now settled sections of the prairie provinces and northern States were once the homes of untold millions of ducks. These prolific nesting grounds are now largely destroyed by the changes that normally go with utilization of a land by agriculture and the other activities of our present-day civilization, intensified by the devastating droughts that have prevailed for the past several years.

I am not underestimating the value of the great breeding grounds still available for ducks and geese in the wilds of northern Canada, but the idea that the birds that once nested on the prairies have simply changed their location during the dry years and are now to be found in immense numbers in the north is entirely erroneous.

As a boy I lived in Manitoba about ten miles from the international boundary line. Goose shooting provided the prevailing sport, the birds being present in amazing numbers. I remember a butcher's window piled high with geese, with a sign inviting the customers to take their pick for twenty-five cents.

Millions of these magnificent birds followed the highways of the air and at the peak of spring migration their calls could be heard almost continually day and night for weeks at a time. They were shot from pits, with the aid of decoys, as many as sixty geese falling to a single gun in one flight. Within an incredibly short time these great hosts had vanished, and goose hunting became only one of the memories of pioneer days.

In 1909 I moved farther west into a newly settled district of Saskatchewan where mallards, the greatest game bird in the world, congregated in thousands to feed on the grain fields. For some years duck hunting proved the universal sport. Even ten years ago, although the birds had become noticeably scarcer, bags of from twenty-five to fifty mallards for one party of sportsmen were of common occurrence.

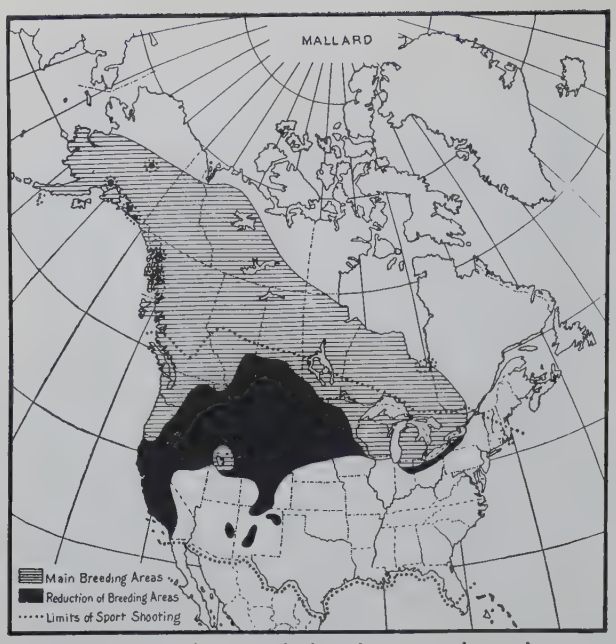
More than any other agency the motor car brought ruin to the ducks. No sooner had the birds established a feeding ground than the killers were upon them and the most secluded barley patch was only an hour's run for the enemy. The depletion of the ducks progressed at an ever-increasing rate until to-day many hunters have practically given up this sport. Now, this happened in the very heart of the duck country, in a newly settled district that was still teeming with wild life, many years after game had practically disappeared from Eastern Canada.

How often I have heard a hunter explain his poor luck by saying that the big ducks had not yet come down from the north. While mallards and several other species are raised over an immense range extending across Canada to Alaska, the northern duck as pictured by our sportsmen has become almost a myth. The fact is that a large part of the immense flights of ducks that once swarmed over this country were home-grown birds, and these decreased along with those from great northern reserves, so that there was no stock of recruits to take their place. Even the North must have breeding stock.

In all the mass of discussion that has taken place in the 20 years that the migratory bird treaty has been on the books, there has been a conspicuous dearth of matter on Canada's side of the question. We might even say that Canada, as the country that produces more than three-quarters of the ducks and geese that are shot in the United States, has been overly courteous in this regard. We are particularly gratified, therefore, to be able to publish this article by a Canadian who has had waterfowl under his solicitous eye for half a century. His closing suggestion is particularly apropos just now.

Conclusive as may be the testimony of the game bag regarding our duck population, May and not October is the proper month to make the estimate. Upon the healthy and wary birds that have escaped the peril of migration depends the future of the race. Only at this time of the year, when the drakes are in full plumage, can the various species be easily identified and their relative strength estimated. For nearly twenty years I have kept a record of all species of birds that came my way, made a special study of the ducks, and noted that year by year the vital remnant has grown less and less. Take it from one who has watched with fascinated interest the return of the birds for more years than he cares to remember, that no over-statement of the seriousness of the duck situation has appeared on the pages of this magazine.

Reports are sometimes conflicting and any estimate of the number of our ducks based on conditions in one locality may prove to be absolutely worthless. Until about six years ago my records of ruddy ducks were few and far between. From that time onward the birds seemed to increase quite rapidly, every slough that provided suitable nesting sites having its flock of these remarkable ducks. Naturally my first impression was that this species was making a good recovery. The breeding range of the ruddy, however, is very restricted and lies almost entirely within the area so seriously affected by recent droughts. The true state of affairs was that this species had become very rare, but because of the drying up of the nesting places



A species whose ample breeding grounds need live birds for stocking

had congregated in considerable numbers where water conditions were favorable.

Near my home is an artificial lake that supports perhaps one thousand ducks. One might gain the impression from visiting it that the birds are plentiful and yet last summer while assisting in taking a duck census I visited farm after farm that once provided good breeding places for the birds, but the sloughs were dry and the ducks gone.

Man is not the only foe of the ducks. In this section the crow is a serious enemy in the breeding season. For some years I have bred game as a hobby. I have been amazed to find how difficult it is to get a setting of wild duck eggs. The nest that someone had discovered and reported to me was nearly always destroyed when I arrived on the spot. I went to considerable pains to ascertain the true relation between the crows and the ducks and came to the conclusion that a duck flushed from her nest stands small chance of preserving her eggs from the ever-watchful crow. No doubt many ducks lay a second clutch which may fare better because of the increased cover and more abundant food for the crows, but the damage wrought by them is unquestionably enormous. Old settlers say there are twenty-five times as many crows here as there were fifty years ago. In any case the black pest has increased many fold and the ducks have decreased in about like proportion.

The Fish and Game Leagues of Canada last year sponsored National Crow Week during which sportsmen were urged by newspaper articles and radio broadcasts to make war on the crows. If this business of crow liquidation were taken in hand by responsible organizations a great deal might be accomplished without endangering the lives of other innocent and beneficial species.

It should be borne in mind, however, that while crows are a serious menace in the agricultural districts of Canada, they are comparatively rare in the north country. Many of those who are loudest in their denunciation of the crow know almost nothing about it beyond their own sections. As a matter of fact, its true status may be well understood by studying the accompanying illustration of the range of the ruddy duck. The drought area in Saskatchewan, and the Lake Winnipeg country, show well the area where the crow is a serious menace; the rest of the ruddy's range to the north marks the area where the crow is present, but not common enough to be important; beyond this the crow is unknown, or is so rare as to be negligible. And if all the crows were exterminated, our North American ducks would still require protection from their greatest enemy, the duck hunter.

My unqualified approval of the views of those conservationists who condemn the indiscriminate killing of what is commonly called vermin! The fact is, the average hunter rarely knows friend from foe. Our large hawks, among the most picturesque and beneficial of our feathered visitors, are perhaps the chief victims in western Canada. They sit unafraid on the telephone poles beside the highways, and many are potted by some hunter who imagines he is befriending the game birds. In my opinion every individual other than a farmer or game keeper who shoots a hawk should be compelled to eat it, feathers, bill, claws and all. These magnificent birds are the true friends of the agriculturalist as any one can testify who has watched a pair carrying gophers and mice from daylight until dark to their voracious family. Not one hawk out of a hundred that falls to a hunter's gun deserves its fate.

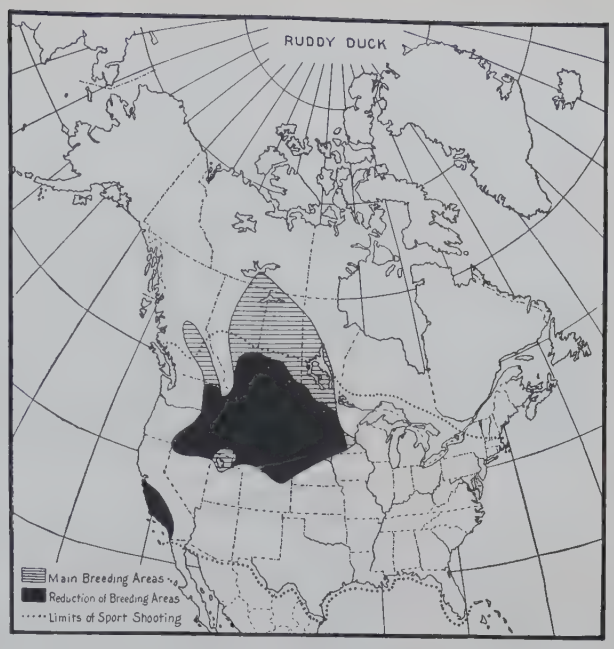
It would be hard to estimate the effect of the great droughts on our duck population. Hundreds of thousands of sloughs and shallow lakes that provided ideal breeding places for our waterfowl have been dry for years or, worse still, contain a limited supply of water in spring and become dry before the young ducks are big enough to make their way to bigger waters. While the dry belt extends over a large section of the best duck country on the continent, it has not affected all species alike. The mallard, followed closely by the pintail, has the greatest nesting range of any duck in America, breeding in many States in the Union and throughout most of the western and northern Provinces. The percentage of its summer habitat affected by drought, though covering millions of acres, is therefore comparatively small. The gadwall, however, while the most widely distributed duck in the world, has a very restricted breeding range, practically all of which lies within the dry belt, and the blue-winged teal and spoonbill are almost as badly off. The black duck, however, nests entirely in eastern Canada and the northeastern states, and has been only slightly affected by drought. But the toll taken by such droughts on our waterfowl as those of the past few years, without parallel since the country was settled, has been enormous.

The governments of the United States and Canada are doing wonderful work in restoring to our ducks some of their ancient haunts, but such succor as these enterprises afford cannot come soon enough to save the situation. We may find ourselves with game sanctuaries,

but no game to stock them. If we would preserve the ducks we must stop destroying them. All the natural causes that have contributed to the decrease of our game are relatively unimportant compared with the destruction wrought by man himself. Why do some sportsmen suggest every other remedy except the obvious one? "Stop the illegal shooting," says one. Shooting out of range destroys more birds than shooting out of season and the game is absolutely wasted. How are we going to stop that? "Establish refuges," says another. Good; but why not make the whole country a sanctuary for a short time. "Control the vermin," some advocate. Agreed, but before the pests can be dealt with, game will be gone.

How do Western Canadian sportsmen view the prospect of a closed season? Most of us on this side of the line take more or less of a proprietary attitude toward the ducks. They are Canadian citizens who go south for the winter, as many of the rest of us would do if our transportation could be as easily arranged. We would be the chief losers if any colorful species were to go into extinction. A closed season all over the United States and Canada would, I believe, be enthusiastically received by most Canadian hunters but they are unwilling to allow the birds to leave this country unmolested only to be slaughtered by gunners south of the line. Our sportsmen do not need any conservationist to convince them that the ducks are in danger. They *know*.

There are at least one million licensed duck hunters in America, about one for every forty ducks still in existence on this continent. The Bureau of Biological Survey at Washington is deluged with ideas for saving the ducks, submitted mostly by men who can't tell a duck from a mud hen. Has anyone suggested that a closed season would be bad for the ducks? Would any sportsman worthy of the name hesitate to donate one year of duck shooting to the cause of conservation, if he believed such action necessary? Remember, one does not need to shoot the last survivor to exterminate any variety of bird or beast. When the number of individuals in any species is reduced to a certain level in relation to its natural enemies, its disappearance in the wild state is swift and certain. Several of our most interesting groups of the duck family are nearing the deadline. Their fate rests in the hands of the sportsmen of the United States and Canada. Gentlemen of the jury, have you agreed upon your verdict? The evidence seems to be conclusive!



MORE THAN HALF OF THIS BIRD'S BREEDING GROUND IS NEARLY DESTROYED BY SETTLEMENT AND DROUGHT

GUNS AS TOYS

EVERY little while we are re-impressed by the serious consequences that attend the association of guns and small boys. We know small boys like to have guns, for we were once boys ourselves. But our parents very wisely did not allow us to have one until we were about fifteen years old. Then we were coached in its handling by experienced men. We have been convinced that this age is early enough to trust boys with such a weapon.

We have many reasons outside of our own experience to strengthen this conviction. Scarcely a day passes that we do not read of fatalities or serious accidents resulting from the careless use of firearms. The more crowded condition of our towns and cities, as compared with former times, multiplies the danger. Air rifles and B. B. guns can now be bought in a hundred places where there was one source thirty years ago. We have known one dealer who voluntarily refused to handle them. His case is a bright spot in the darkness. He had thought out the matter.

Every summer we learn of song birds being killed by boys in the suburbs of Washington, a bird sanctuary. In a city where any child can buy an air-gun or B. B. gun, such occurrences are only natural. Within a month we have seen boys shooting in the heart of the city. We do not think Washington is any worse than the other cities.

A circular issued by the Illinois Congress of Parents and Teachers is responsible for the statement that in one institution for the blind "there are 300 children who must go through life sightless, because their eyes were put out by play guns." The statement is a part of a pledge, circulated among the scholars of the public schools, in which the child promises not to play with weapons. We note with unqualified approval that the parents of these school children are also asked to sign a pledge of cooperation.

There are many aspects to this question of the association of guns and small boys. Many good people are convinced that it is responsible in no small part for the increase in crime among our young people. Perhaps they are right. Certain it is that guns in the hands of boys result in the death of hundreds of children and the destruction of millions of innocent wild creatures.

We bespeak the consideration of this vital subject on the part of all teachers and parents. The Illinois Congress of Parents and Teachers can be reached by addressing Mrs. W. F. Krahl, 5330 Dorchester Ave., Chicago, Ill.

THE VALUE OF WOODCHUCKS

By WALTER J. SCHOONMAKER

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Assistant State Zoologist of the New York State Museum, Mr. Schoonmaker has devoted several years to a systematic study of the woodchuck in the scheme of Nature. He is an active conservationist and an excellent photographer of wildlife, a young man to whom we may look for assistance in the struggle to conserve our remaining wildlife resources.

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The woodchuck of the North, groundhog or moonack of the South, is known to all. Where man has planted clover or beans near his haunts, the woodchuck makes use of them. In such cases the farmer has always sought his scalp, although he seldom kills one that is living away from his fields.

But removing woodchucks one at a time irked the experts. So they called in the chemists, and a poison gas was the result. Now the farmers are encouraged to put cyanide in every burrow. This method gets the few woodchucks that eat the beans, and also those that would feed the foxes and wildcats. The gas also kills the skunks, cottontail rabbits and opossums that have become unbidden guests or tenants of myriad homes dug by many generations of woodchucks, for a burrow, once dug, may serve as a home to many different animals for fifty years.

Read this article and tell us whether you think the indiscriminate gassing of woodchuck burrows should be tolerated.

•

FROM the rocky coast of Maine to the shores of the Pacific, in fact over all of the world, there are those who ask, "What good is that mammal, or that bird, or that snake?" And here in these United States, there are many who have asked, "What good is the woodchuck?"

Some want the value of the creature in dollars and cents, while others would learn of its value in an economic sense.

From the farmers' point of view the woodchuck is a destructive creature that digs holes that are said to endanger the legs of horses; that piles gravel and dirt in mounds that dull the knives of farming machinery, and that destroys alfalfa and clover and other crops by eating, or trampling down what it does not eat.

That is the usual extent of the damage charged to the creature, and that is why it has many enemies and few real friends.

The farmer, then, regards the woodchuck as an enemy, and the hunter in this case sides with the farmer and looks upon the creature as a menace. This of course gives him ostensible reason for killing. He tells that the woodchuck is wary and indeed difficult game, and thus seeks more credit for the killing.

Ofttimes, hunters with guns in hand will talk of the useless woodchuck. Do they not realize that the animal at that very time is affording them sport and recreation? Indeed, most of these hunters see the chuck only as a living target and from this angle they are not qualified to act as judge, jury and executioners. To a creature that has given them sport and outdoor recreation they owe at least a kind thought and a good word.

The trapper who sets his traps in dens often catches

TWO WOODCHUCKS, OBJECTS OF A CONTINUOUS VENDETTA

Yet they have a place in Nature's scheme of things that man chooses to ignore for reasons that do not go deep and because he likes to have an excuse for something to shoot at

a woodchuck instead of the expected fox, raccoon or skunk. And such a trapper, though not wanting the chuck, seldom releases it, but with all of the contempt influenced by popular prejudice crushes its skull and flings it aside.

Trappers in general look with disdain upon the woodchuck, but, whether they know it or not, this same groundhog furnishes much food for the red foxes that they so highly prize. Also the lowly chuck is the digger of the east as the badger is the digger of the west, and it is the dens of this creature, sometimes enlarged and modified, that furnish homes for the raccoon, red fox and skunk, three animals sought by the trapper. The cottontail also seeks the dens of the chuck when hard pressed by dogs or through natural desire for a winter shelter.

So it is that the farmer is an enemy of the woodchuck, the hunter seeks excuses for its killing, and the trapper disdains it and kills without mercy or reason.

The farmer would destroy the woodchuck to protect his own crops and that is fair enough. The hunter and the trapper, however, feel that all wildlife belongs to them—to hunt and to trap and to kill, and for years they have had the field to themselves. But if ever the title of ownership is to be justly awarded, consideration must surely be given to that unselfish group of Nature lovers, comprised of men, women, and children who ask no more than to look upon the wildlife, free and unmolested. The position of this group can be confirmed no better than by the words of Edward A. Preble in NATURE MAGAZINE in 1927.

"And to whom belongs this wildlife that is so fast being sacrificed to greed and vanity, and at such serious cost to our finer qualities, however dulled? These creatures of the wild belong to all of us in so far as we have the mind and the will to appreciate their beauty and companionship. They are a part of that great and glorious heritage that has come to us who read these lines, and to the millions who will never see them, and to our children and their children. And they belong peculiarly to those of us who have not the wish to sacrifice them for our own temporary pleasure and profit. As for those who exploit them, and to whom wildlife is valued only in dollars, *they* have long since destroyed their share."

The ideals of this group cannot be criticized. And it may be that the sportsmen should not be judged too harshly. There have been hunters in the past, there are hunters now, and probably there will be hunters in the future. Indeed, to hunt seems to be an inborn, unrestrainable desire with some. It is cruel, and to many it is objectionable. That is agreed. Yet, one who hunts fairly, who is a true sportsman—not merely a hunter—is pretty near beyond reproach. Such men usually have high standards and fine ideals and very often think of killing in a different light after a time, and cease to kill for sport.

To those who will kill the woodchuck, however, there are some outstanding facts which we may hope they will some day consider. The woodchuck is a living creature that feels pain, and experiences love and fear even as Man. It is a creature to whom life is dear; a creature that fits somewhere in Nature's great plan; a living thing that requires years to become full grown, yet a thing that Man may destroy in an instant but can never replace. To hunt and to kill such a creature is a privilege taken, and not a right given.

Now then, just what good is the woodchuck? Well, that depends entirely upon you. He has won a place in Nature, and is not Nature a wise mother?

●

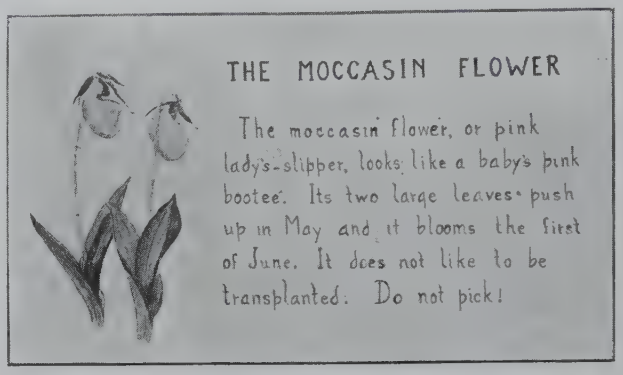
All those who wish to have a voice in deciding the fate of our wildlife species, whether game or song birds, fur mammals, big game or fishes, should take a militant part in the discussions that are now being held in nearly every county under the auspices of the Junior Chambers of Commerce, and should keep in touch with, and become active in, the formation of State Wildlife Federations.

A Nature Trail For May-Day

By CLARA B. DEAN

WORKING on the ancient theory that owners are the best conservationists, we decided to build a Nature trail that would belong to the students of our Nature study classes. We thought that those students who had been studying the local flora needed to have an experience of living with plants for which they were responsible. Nobody can dig and plant and cherish flowers and ferns, bushes and trees, without learning the needs of his plants and resenting the destruction of growing things in his own garden, and in the great natural garden of the forests and fields. So we believed, and so it worked out with our Nature trail and its owners.

The motivation for making a Nature trail on our school grounds was a field trip to the large city park where the local Natural History Museum had made a beautiful Nature trail that followed the banks of a lake and climbed a hill. The children who knew so much of the flora that was labeled there were pleased to follow the trail and match their learning against the information on the signs that identified the plants and gave a brief history of them. The students knew many of the common trees; they could distinguish between some of the varieties of oaks and pines. They knew some of the herbs and their uses. They had divided the wild flowers into those that might be picked and those that must be protected. Completing the marked trail, they tested their new learning on a like trail, and they were pleased to find they had learned so much.


THE MOCCASIN FLOWER
The moccasin flower, or pink lady's-slipper, looks like a baby's pink bootee. Its two large leaves push up in May and it blooms the first of June. It does not like to be transplanted. Do not pick!

PARAGRAPHS WERE WRITTEN ABOUT ALL THE FLOWERS AND APPROPRIATELY ILLUSTRATED

Before we left the park grounds one of the children suggested, "We could make a Nature trail on our own school grounds." The others approved and the planning began. We could have it ready by May-day, they thought. Of course it would not be perfect by that time; we must do some fall planting and give things at least a year to grow before we could be satisfied with it. But we could have our opening in May. There were so many trees and bushes that we had only to label, and other things, planted carefully, would bloom for us then. The Christmas fern and the interrupted fern would be at home there; the anemone would be blooming then, the bloodroot and Jack-in-the-pulpit, the dogwood, perhaps, if the season was very early, and some of the azaleas, surely. So our plans grew, to be modified as we tested them.

We made our trail, weeded, transplanted and planted, and labeled each different plant with a number. Then every student selected a particular plant for his own. He made himself Authority on one flower, fern, bush or tree. He knew that he must be able to talk to the group about his plant. He must be able to answer questions about its habits of growth, its distribution, its rarity, its uses, its response to cultivation. To do this he must supplement his observation of the plant and his experience in working with it by reading many articles, seed catalogues, and chapters in Nature books.

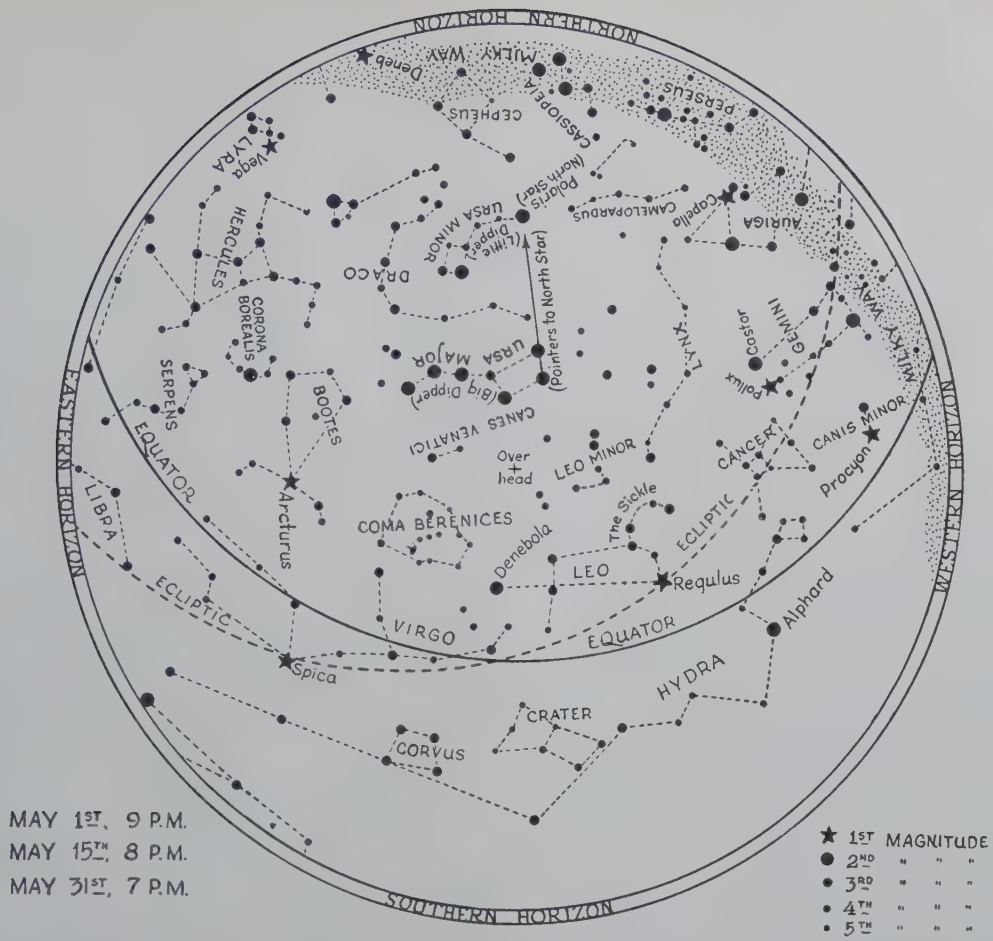
We bought a few new books for our school library and borrowed other books from the city library. We went into our files of Nature pictures we had mounted. We dug up old copies of NATURE MAGAZINE.

Our research ended, each child wrote a paragraph for a placard to be hung on the wall of the classroom. The writing of the paragraph was a task that must be done well, because a few facts must be selected from the many, and these facts must be interesting and important. To help identify the plants, the children sketched and painted pictures of them, making the placards colorful as well as informative. These placards made an indoor Nature trail.

On May-day we were ready. We were opening our Nature trail for our parents, making a contest of it. No child was unprepared, because he knew that he must be able to coach his parent for the contest. The parents were cooperative, good natured, and proud of their children. Many of them worked hard over the contest, trying seriously to win. Each child served as guide for his parent, who studied the placards and asked questions of the Authorities. The parents were then led to the Nature trail outside, where only numbers marked the plants. They were given cards and told to place the correct name beside each number. The winning parent received an appropriate prize—a bouquet of flowers that could be picked without injury to the plants. And the May Queen, the smallest tot in the pre-primary, presented the bouquet.

Such a project as ours can be duplicated in almost any school. If the school grounds have no rough or wooded places for Nature trails there are often nearby vacant lots that can be improved with the consent and perhaps the assistance of the owner. Perhaps the children and nature-loving citizens will donate the plants. Garden clubs like to assist in such projects.

If every school could have a Nature trail for May-day our young citizen would become a practical wild flower conservationist. He would know the native flora and appreciate it. He would cherish those things he had helped to plant and to cultivate. Then our teaching of conservation in the schools would have real value; we would have graduated from words, too often merely poetic and sentimental, to the real practice of conservation.



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south

Watch for Mercury in Early May

By ISABEL M. LEWIS

THE LITTLE planet that is reputed to be the most elusive and least observed of the five brightest planets will give everyone a fair chance to observe it during the first two weeks in May, when it will be more favorably placed for observation in the evening hours than at any other time during this year. On the first day of May, Mercury will be almost within the Pleiades in Taurus, and during the next two weeks it will move rapidly eastward, passing about eight degrees due north of Aldebaran, the ruddy first magnitude star in the V of the Hyades, on May 10. It will decrease rapidly in brightness during these two weeks. On May 1 it will surpass in brilliance all of the brightest stars in view with the exception of Sirius in the southwest and it should be found without difficulty in the twilight. It should be seen at its best on May 7 when it will be about twenty degrees above the western horizon at sunset and at its greatest distance east of the sun. It will then be less brilliant than on the first of the month and not quite as bright as Vega. By the middle of May it will have decreased to a brightness equal to that of Spica or Regulus.

As Mercury is so close to the sun that it can be seen only in the twilight, it is too low in the west by the time the outlines of the constellations may be traced to be located with respect to them. It shines forth, therefore, only with the brightest stars then above the horizon, namely, the brightest of the stars in Orion, which is then very low in the southwest, with the Dog-stars, Sirius and Procyon, with Castor and Pollux in Gemini, Regulus in Leo, and with Aldebaran in Taurus, to which it will be nearest, and by the aid of which we will most easily locate it. During the two weeks that it may be seen it will pass from a point close to the Pleiades and a few degrees northwest of ruddy Aldebaran to a point a few degrees northeast of it and about half way between Aldebaran and the bright star Beta Tauri at the tip of one of the horns of The Bull. The planet will be easily recognized by the fact that it is rapidly changing its position with respect to Aldebaran from night to night, and moving eastward. One should look for it immediately after sun-

set and not far above the western horizon. It will probably not be possible to observe it for more than half an hour as it will be carried rapidly toward the horizon by the earth's diurnal motion.

It may, at first thought, seem strange that Mercury should so rapidly decrease in brightness during these two weeks when it is actually drawing closer to the earth. On May 15 Mercury will be about 27,000,000 miles nearer to the earth than it was on May 1. When it arrives at inferior conjunction with the sun on May 31, at which time it will lie directly between the earth and the sun, it will be about forty million miles closer to the earth than it was at the beginning of the month, and distant from us less than fifty-two million miles. The rapid decrease in the light of the planet is because of the fact that it has phases like the moon. Its orbit lies within the orbit of our own planet and as it draws nearer to the earth more and more of its night side is turned toward us. Although the disk, or visible surface, of the planet increases in size as it draws nearer to the earth, its total illuminated area during the time it is observable decreases. It changes from the phase of the gibbous moon to that of half-moon when at its greatest distance east of the sun, and then to a rapidly thinning crescent, such as the moon exhibits before it is "new", at which time its night side is turned toward the earth and is invisible. When Mercury is nearest the earth and at inferior conjunction it is invisible not only because it is in line with the sun, and therefore lost to view in the glare of its rays, but also because its unilluminated or night side is turned toward the earth. A few days before or after this date, if viewed through the telescope, it would appear as a thin crescent, similar to the moon a few days before or after new moon.

Mercury is a little world of great extremes of temperature. It is practically certain that it has no atmosphere and that it always keeps the same side turned toward the sun. As a result the temperature of its day side is tremendously high. Radiometric measurements show it to be as great as 350 degrees Centigrade, which is hot enough to melt lead. On the night side where the sun's rays never fall the temperature must be close to the absolute zero of interplanetary space. The low reflecting power of the planet's surface, which is less than that of the moon, indicates that the sun's light is reflected from a solid rather than a gaseous surface that is probably very similar to that of the moon. As the planet turns once on its axis at a uniform rate in the same time that it completes one trip around the sun, 88 days, its motion in its orbit is very far from being uniform on account of its great ellipticity. It follows that there is a region between the day and night side that is alternately in daylight and darkness. In this zone the sun alternately appears and disappears and great extremes of temperature prevail. No life can exist on this little world because of its lack of an atmosphere and its great variations of temperature. It probably resembles our own moon more than any other member of the solar system. In size it is even surpassed by the largest satellite of Saturn, Titan, and possibly also by Ganymede and Callisto, the two largest of the four historic satellites of Jupiter. Since the discovery of Pluto it is uncertain whether Mercury may still be considered to be the smallest planet in the solar system, for the size of Pluto is not known. It is, however, beyond doubt a very small world. It is very improbable that it exceeds Mars in size and it may be even smaller than Mercury.

As Mercury disappears from view in the west in the twilight of an early May evening we may look for the giant planet Jupiter to rise soon in the east. There is something very impressive about the appearance of this great world with its unflickering golden radiance that seems to set it apart from all the other planets, although Venus far surpasses it in brilliancy. More than 25,000 planets the size of Mercury could be fashioned from the planet Jupiter, and about 1300 planets the size of the earth or Venus. Telescopically it is more interesting to observe than any other planet in the solar system with the exception of Saturn and its rings. Both of these planets have nine satellites.

Saturn may now be seen in the morning sky for two hours or more before sunrise in the southeast. It will be of particular interest next month when its rings will temporarily disappear from view when they come directly in line with the earth. They are now narrowing rapidly and will soon be not much more than a thin line. The flattening of the ball of the planet, which is greater than that of any other, is very noticeable at and near the time of the disappearance of the rings. If possible one should try to observe Saturn through the telescope and observe the gradual disappearance of its rings, a phenomenon that happens only twice during its twenty-nine and a half year period of revolution around the sun.

Venus is still a morning star but is now too close to the sun to be observed, and Mars also cannot be seen this month as it is now very low in the west at sunset.

May is an excellent time of year to start a study of the spring and summer constellations. All of the spring constellations are now well in view in the evening hours and the mild spring evenings add to the pleasures of star gazing.

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One of the many interesting pictorial features to be found in the June rotogravure section of Nature Magazine is a group of fine frog pictures by L. W. Brownell, noted Nature photographer. This informative feature will be valuable to all who wonder just which member of this group of batrachians they hear calling from the damp and marshy spots. This is only one of the many features that make the June pictorial section a real source of information and fascinating pictures.

Trailside Treasures

THE CRADLE OPENS

By JANE ADAMS PARKER

IT WAS quite late in the afternoon as Jo and Jerry, the twins, and Rosy Posy stopped in to see Jackie, on their way home from school.

"Here we come," Jerry announced gaily, as they trooped up the walk to the porch where Jackie was sitting.

"Oh hurry!" he called. "The moth is coming out of the chrysalis that Jerry found."

Mrs. Knight brought chairs so they could sit down close to the small table. True enough, as they watched, the moth finally dragged its body out of the little brown "cradle" that had held it safely all winter. For a few moments, it stopped, as if to rest. Then very slowly it crawled up over the empty pupa case onto a branch Jackie had stuck into the sand in the box.

"O-oh," said Rosy, "what tiny wings it has, for such a big body! How can it ever fly?"

"Just wait and see what happens," said Jackie's mother.

As she spoke the moth gently lifted its drooping wings and began to fan them back and forth. As it fanned, the queerest thing happened. . . . The wings grew larger and larger, while the body seemed to grow smaller.

"Its hind wings are much smaller than the front ones," said Jo, "and its body has six yellow-orange spots on each side."

SLOWLY IT CRAWLED ONTO A BRANCH JACKIE HAD STUCK INTO THE SAND

"The wings are grayish-brown, with darker bands on the back ones," exclaimed Jerry. "It's just what I thought, a . . ."

"Tomato Sphinx Moth," Jackie laughed. "That little 'handle' was a case for the long tongue that it uses for sucking the nectar from flowers. See—it's curling it up now to tuck away."

"Just to think," went on Jerry, "that its caterpillar was a big, green Tomato Worm."

"Maybe it came from the tomato patch we had last year, down near the Old Cabin," said Jo. "Isn't it called a Hawk Moth, too, Mrs. Knight?"

"Yes," answered Jackie's mother, "and some are called Humming Bird Moths, because they look something like the little birds, with their long tongues. And they make a low humming noise as they flit among the flowers. Some Sphinx Moths spin a loose cocoon among the fallen leaves and change to the pupa on the ground. Others, like our Tomato Worm, burrow down into the earth. There the caterpillar makes a little cell by pushing and patting the earth into a hard ball. Then it keeps quite still. As it rests, its body grows shorter and shorter. By and by it begins to squirm—until, pop!—the earthy skin bursts open and releases the pupa case. At first it is brownish-green, and real slippery. But it soon becomes quite hard

and darkens into the reddish-brown case like the one Jerry found."

"When it's almost time for it to come out a moth," Jackie continued, "it just uses those little rings around the case to help itself wriggle up to the surface. Mother says this one came out early, because I kept it in the warm house. Some of the Sphinx Moths fly out in the bright sunshine. But this one generally flies in the early morning or real late afternoon. There, look, away he goes!"

The children clapped their hands as the big, strong moth flew off. Then Jerry turned to Jackie. "Now tell us your surprise," he said.

For his answer Jackie turned to a small cabinet and took out a new camera. "It'll take the swellest pictures of bugs and spiders and all sorts of things," he said. "I'll have some ready to show you Saturday, if you can come."

"That's dandy," said Jerry. "We'll be here sure to see them. But we've got to start home now. Mother'll worry."

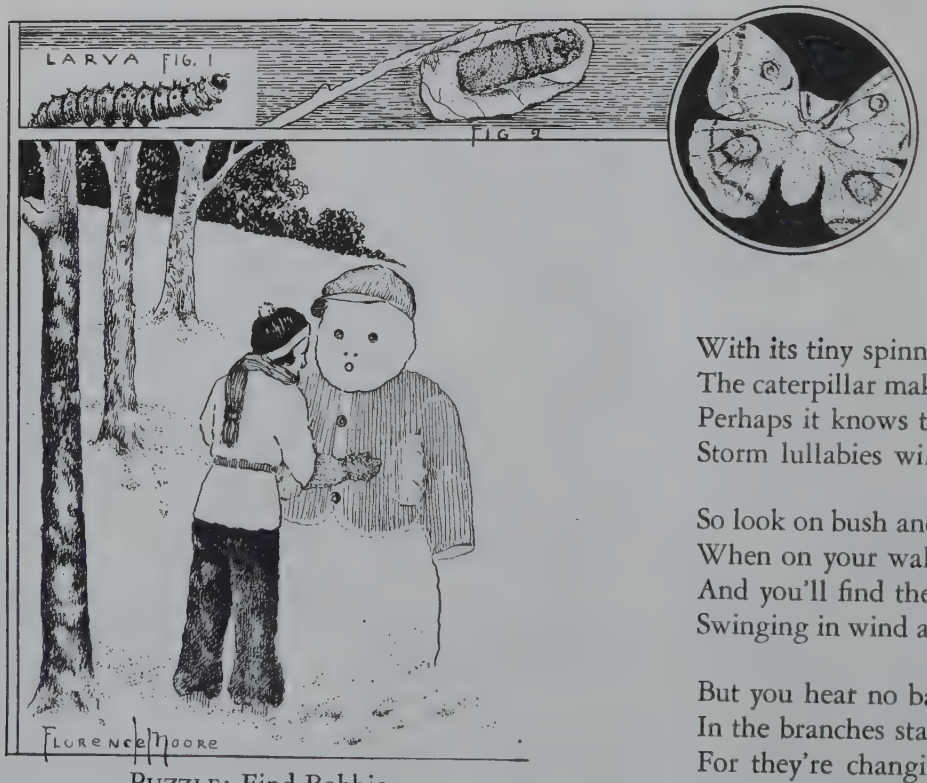
"Be sure to look both ways, before you cross the street," Jackie called after them, as they skipped along.

Running and laughing they soon reached the little path through the woods. But just as they started in something went *"zing"* through the branches overhead.

"My!" exclaimed Jerry dodging back and pulling the two girls after him. "What was that?"

They waited a moment breathless. Then suddenly Jo ran forward and knelt down on the ground. "Come quick and see what happened," she called.

What did Jo find on the little path through the woods? (To be continued.)



PUZZLE: Find Bobbie.

NOTE: Moths and butterflies belong to the order *Lepidoptera.* These must pass through the larvae and pupal stages before becoming adults, but some species in both groups do not form complete cocoons. Fig. 2. Section of cocoon cut away, showing the moth baby within.

THE SNUG COCOON

By FLORENCE H. MOORE

With its tiny spinneret,
The caterpillar makes a snug cocoon;
Perhaps it knows that winter,
Storm lullabies will croon.

So look on bush and tree,
When on your walks you go—
And you'll find these winter cradles,
Swinging in wind and snow.

But you hear no babies cry,
In the branches stark and bare,
For they're changing in the quiet,
Of their cradles hanging there.

Babs brought one in last winter,
To a warmer lullaby—
And when the *Moth* came out,
She thought it a butterfly.

Nature For Young Folks

In *A Child's Story of the Animal World*, by Edward G. Huey, we have an authoritative book written by one who has wide experience in teaching natural history to young people. Also, the author has spared no pains to select from all over the world subjects that are typical of the principal groups of animals, applying this term in its broad sense. Supplementing his own wide knowledge, the author has drawn on authoritative sources for his accounts of the creatures of fields foreign to his own experience; and his selection of types for treatment, and his skill in winnowing out the false from the true, evinces a fine sense of discrimination that is especially pleasing to anyone who has a fair cross-section picture of the mass of books on Nature subjects that are now flooding the market.

The book consists of twelve chapters. Four are devoted to mammals, ranging in size from shrews to whales. Others are on birds, fishes and near-fishes, insects and their relatives, and invertebrates of the waters. The author even has something to say about organisms so tiny and simple in structure that they cannot with certainty be called either plants or animals.

We have examined the book with some care and have detected no errors worth mentioning. Altogether we consider it one of the most valuable works on natural history ever published for children. The book has 355 pages, is well illustrated, and has an excellent index. If we could have had such a book when we were small it would have been worth a thousand dollars to us by now, even if we had to borrow the money.

The book is published by Reynal and Hitchcock, New York City, and the price is $3.50. —E. A. P.

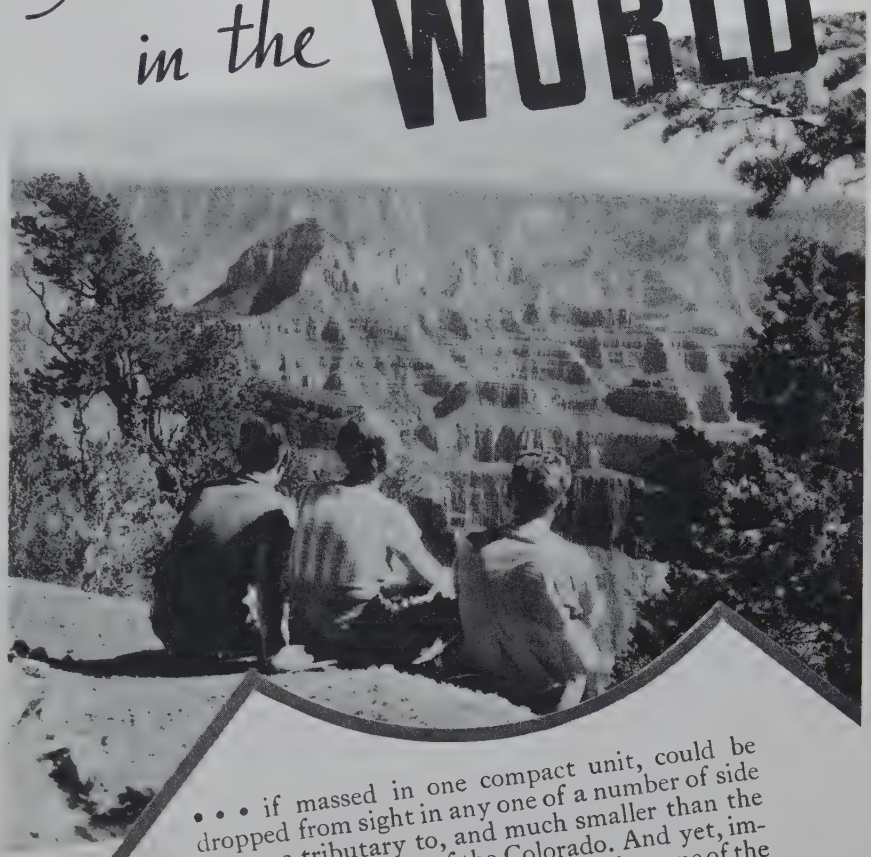
Oregon Nature Course

A pleasant vacation at the beach plus an opportunity to study outdoor life is offered by the Northwest Nature School, conducted by the Oregon Audubon Society of Portland. The school's summer sessions, conducted in two-week sections beginning June 16, June 30, July 14 and July 28, are held at Delake, Oregon, one of the state's most delightful coast resorts.

Situated on a narrow strip of land between Devil's Lake and the beach, the location offers an ideal setting for Nature study. Every type of natural habitat that might be found along the Oregon coast—sandy beaches, rocky cliffs, mud flats and salt water lagoons is within easy reach. Gulls, cormorants, pigeon guillemots and other sea birds can be studied in their rookeries on the steep cliffs abutting the ocean. Devil's Lake itself furnishes abundant material for the study of fresh water biology, while adjacent forests, bogs, brush lands and open meadows complete the setting for the fauna and flora of Oregon's coast.

The cost of the two-week course, including the seven-fifty class fee, travel expense to points of study, cottage, off-shore boat trip, food and incidentals, is estimated at the nominal sum of $25.00. Since only a limited number of students can be taken in any one period, reservations will be accepted in the order received. For further information write to H. M. Du Bois, RFD, Clackamas, Oregon. If you delay until after June 10, the address is Delake, Ore.

All the People in the WORLD



• • • if massed in one compact unit, could be dropped from sight in any one of a number of side canyons tributary to, and much smaller than the vast Grand Canyon of the Colorado. And yet, impressive as this inspiring region is, it is just one of the many breath-taking sights on a 6-day motor tour of Zion-Bryce Canyon-Grand Canyon National Parks.

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A Department of Aid to the Teacher

Mysteries of Nature

In this article, Archibald Rutledge presents material for meditation. It is wholesome for all of us to learn that there are facts not known to us and senses that perhaps we do not have. In our present scientific age children may get the feeling that they can understand everything and control anything. The danger in this point of view lies in the fact that it is partly true. As a great teacher of Nature Study once told her classes, children may have their own way with their parents, manage their teachers, break laws and evade the policeman, but, they cannot break the laws of Nature and escape. The sooner they learn this, the happier they will be in life. The anecdote of the baby who petted the rattlesnake serves to substantiate the theory of snake charming, lack of fear on the part of all participating. Unconsciously, this child acted in accordance with the law, and was not hurt. As adults we realize that it is through knowledge of the forces of Nature that control is made possible and that this knowledge is limited; in some cases it may be lacking altogether and so control is limited. This is just another way of saying that for every effect there is a cause but we may not be able to understand the cause.

●

A Modern Fossil in Armor

The king crab, an interesting, living relic of the past, fits well into the biology program of the senior high school. These classes might be interested first in its life history, as presented in this article, and then in doing some research on such problems as the classification of the king crab.

●

Of What Value Is the Woodchuck?

Here is another animal we must take under our wing of protection lest it perish from the earth. If science teachers the country over could unite to put across some of their ideals of conservation, we could change the wildlife outlook in twenty years. Nevertheless, without such organization, individual teachers and school systems can accomplish much. In our approach to this problem let us not forget that there are two aspects, one informational and the other emotional. The former should be provided for by the course of study, but the latter is caught from the teacher or some pupil in the group.

When possible a woodchuck could be kept as a pet. Those who care for him are apt to become attached to him. This is an effective way to make staunch conservationists. On field trips the pupils should become acquainted with the evidences of the presence of this animal, and the relation of the woodchuck to other animals should be pointed out to them. In the classroom, through reading, discussing and recording observations in notebooks, pupils should be led to realize that the woodchuck harms crops only locally; it digs burrows that other animals use and so it is of considerable use in the scheme of Nature; it has interesting habits, and it is becoming scarce.

In order that teachers and parents may further use Nature Magazine as an aid to the study of Nature and Science, this page is devoted to the following brief notes based upon articles in this issue and suggesting ways in which they may be used as a source of inspiration and information. To bring these Nature study thoughts to our readers we have obtained the services of one eminently qualified for the task, and this department is edited

BY ESTHER SCOTT

Instructor in charge of Elementary Science Washington, D. C., Schools

●

Know Your Soil

In times of more or less uncertain economic conditions, when even the children have a feeling of insecurity, it is well to remember that the man who commands the soil need not go hungry. School gardens and lessons taught about soils may well serve both an economic and an educational purpose. In addition, gardens provide vital experiences that lead to a better understanding of life and Nature, and also provide healthy exercise in the open air. As a basis for garden instruction, this article is especially useful.

The wide variation in soil texture may be presented by an experiment using three lamp chimneys, into which heavy clay, sand and leaf mold have been placed respectively. By pouring water simultaneously through the chimneys, pupils can observe the order in which water passes through these soils. By allowing the lamp chimneys to dry out after the experiment, pupils can determine which of these soils will hold moisture longest. Some understanding of the results obtained may be given by comparing the soil particles with marbles of different sizes, showing that larger marbles when piled up in a glass allow larger air spaces between them than smaller marbles.

Each of the soils used in this experiment could be placed in a separate flower pot and the same kind of seed planted in each. In addition a fourth flower pot should have the same kind of seed planted in a mixture of all three kinds of soil. If all four flower pots are given identical care, the seedlings in the loam will produce the best results. The fact that all plants take in the elements of their food in a liquid condition may be impressed by growing seedlings in water to which has been added the proper chemicals for plant growth.

Since slight variations in the acidity of soils that might mean life or death to a plant would not be indicated on a litmus paper test, this method can not be substituted for the regular soil tester. However, it is practical to have pupils make lists of plants found growing along the edge of limestone roads and species growing in the shady moist sections of the woods, to bring out the difference in the plants found on sweet and acid soils. The rich moist condition of the woods soil may be observed and discussed to show the relationship between leaves and water supply and leaves and soil fertility.

A school garden compost pile affords the opportunity to show pupils how leaves change into dark, rich soil. In addition it provides material for lessons on bacteria and acids and bases. An experiment with a compost pile may be easily carried on indoors using five preserve jars. In one jar place moist leaves and soil; in another moist leaves and soil to which has been added teaspoonful of lime; in another to which a half-teaspoonful of super phosphate has been added to the leaves, soil and lime; in another place a teaspoonful of ammonium sulphate in addition to the leaves, sod, lime and super phosphate. In the fifth jar add the same ingredients as in the fourth one. After carefully mixing the contents of the fifth jar, heat it so as to kill the bacteria. At least once a week the contents of the jars should be stirred with glass rods that have been sterilized and are used only in particular jar.

Experiments may be conducted to show the possibility of the improvement of soil by comparing the growth of the same kind of plant in heavy clay, in heavy clay lightened with ashes and in the same clay to which humus and ashes have been added.

●

"Old Toxico"

This article should be read by all teachers and pupils who expect to make any expeditions in the outdoors. The identification of this poisonous plant may be safely taught indoors if the specimen is brought into the classroom in a sealed fruit jar. If, in placing the plant in the jar, any of the leaves touched the outside of the jar, this part of the jar should be carefully washed with washing powder before any of the pupils are permitted to touch it.

●

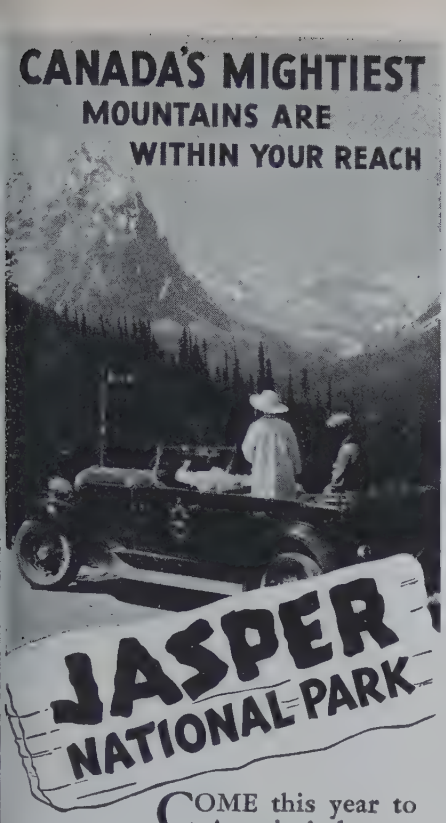
The Bugazoo

This is an activity that may be suggested to any club in which people become acquainted with the outdoors. Collections of seeds could be encouraged throughout the growing season and an exhibition held just as is suggested in this article. The construction of the specimens would necessitate some attention to the anatomy of the creatures copied and the exhibition would help to impress the wide variation in the species of animals.

●

A Nature Trail for May Day

Teachers everywhere could profit by reading this article. In the first paragraph Clara B. Dean has given the keynote for the teaching of conservation and also training in good citizenship. Throughout the article, there are suggestions for practical teaching situations that any school might consider. Such a plan could be combined with any school garden and the contest among the parents would be a delightful feature for any May Day.



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A MODERN FOSSIL IN ARMOR

(Continued from page 269)

is left for *Limulus* is a grubbing, mole-like existence. It spends its life prowling slowly and without grace along the floor of shallow bay and sea below the low-water mark, in the never-ending search for the worms and other soft-bodied animals that form its food. It is inoffensive, unintelligent, but enormously interesting, nevertheless, because of the line of descent that links it closely with the remote past.

We restored Madame Limulus carefully to her hole, carefully covered her up again, and left her to finish undisturbed her most important job in life—the preservation, unbroken, of that line of descent.

Illinois Conservation

Pointing out that diminishing supplies of game and fish, erosion of soil, loss of forested areas, and pollution of streams have led to a demand by the people of the state that the natural resources of the state be preserved, Henry Horner, Governor of Illinois, has proclaimed the week beginning May 10 as Conservation Week.

Illinois, in common with all the rest of our states, needs to conserve its resources. We shall look forward with hope to the results of this effort.

On Mothers' Day

Sunday, May 10, will be observed throughout the United States as Mothers' Day. Letters and other remembrances will be given by grateful sons and daughters. The observance of Mothers' Day in this manner is a beautiful custom.

The Golden Rule Foundation of New York urges that we "Observe Mothers' Day the Golden Rule way." There are today many American Mothers who lack necessities of life, medical care, and hospital, clinical and maternity center service. Anyone so fortunate as to have a mother living should remember her on Sunday, May 10; but the less fortunate mothers also should not be forgotten. Mothers' Day is an excellent time to contribute to your local hospital, maternity clinic, or home for the aged. A gift in your mother's name to a privately supported institution caring for neglected and destitute mothers is one of the finest ways of honoring motherhood.

Duck Slaughter Expensive

Killing more than 200 wild ducks last November recently cost three Californians more than $600, according to reports sent to the United States Biological Survey.

The duck killers pleaded guilty in Federal Court at Sacramento but claimed that the ducks were damaging the rice field where the killing took place. The court fined the owner of the field $300 and costs and one other defendant $150. The third defendant, a former violator, was fined $150 and sentenced to serve thirty days in jail.

Migratory birds doing damage may be killed only under permit. However, many false claims of damage suffered have been filed by people whose real purpose was to kill game birds out of season or in excessive numbers.

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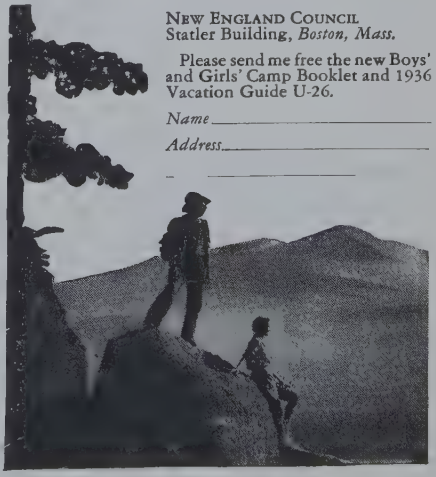

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Hiking and Camping Forum

Conducted by
ERNEST A. DENCH

Hiking and camping inquiries will be answered by mail if a stamped, addressed envelope is enclosed. Address the Forum editor.

FORUM PUBLICATIONS

Let It Rain. How to be properly protected while hiking or camping in the rain. Clothing and equipment suggestions and listings.

Camp Cookery and Its Preparation: The title explains the chief contents. Will be published on or about May first. Advance orders taken.

Either bulletin is sold at 3 cents per copy to members, or 10 cents per copy to non-members.

NEW YORK MOUNTAIN CLUB PARTY CLEARING THE TRAIL IN PALISADES INTERSTATE PARK. PHOTO BY C. H. HALEVY

Brevities

Milwaukee hikers are elated at the prospect, this spring, of a system of inter-county trails and over-night hostels. Favored locations include the Kettle Moraine, Terry Andrae park dunes and Waukesha chain of lakes. . . . Climbing was taboo on the valley hike staged by the Maryland Appalachian Trail Club. . . . Not to be outdone, the Prairie Club decided the Alpine hazards of the Dunes in late winter warranted the appointment of a Ropeteer, one Edward J. Hahn, who flourished a new stout rope. Yes, it's contrast that makes such events unique. . . . The Wy'east Climbers cabin was crowded on two recent occasions with groups from the two other Portland (Ore.) clubs—Mazamas and the Trails Club. Forum editor considers inter-club hospitality one of the finest things Organized Hiking has to offer. . . . An industrial hike once a month on a Wednesday evening is part of the bill of fare provided by Richard Foertsch for the Minnehikers. A recent destination, followed by an inspection, was a flour mill. . . . Manchester, England, contains a rambling club for the blind. . . . Daddies had best make no mention of the Big Rock Candy Mountains to their kiddies. "The snow is as sweet as candy and hard as rocks," states Sierra Club schedule, Southern California Chapter. What a boon to dentistry! . . . From an overseas shoe ad: "This shoe is good for at least 1000 miles of walking, because it is made here from the right materials, in the right way, by the best people." If American footwear is ever sold on a mileage basis, will an allowance be made for different types of hiking terrain? . . . Colored art work enhances the mimeographed pages of *Talk O' the Trails,* edited and produced, respectively, by Gladys Ainsworth and Ruby Johnson, for the Blackhawk Trails Club. This Rockford (Ill.) group recently celebrated its tenth anniversary. . . . What club hasn't a member with a natural aptitude for straying from the fold on the trail! Long-suffering leaders of a western club threaten to hang a lantern on the erring one's pack and furnish him with a bag of confetti. . . . In his textbook on *Mountaineering,* Sydney Spencer pans Soviet Russia for hoarding its virgin peaks. Maybe Russian officials dread the messy job of handling the casualties. . . . Our northern clubs are relieved to see the back of Old Man Winter, who played great havoc with schedules. How many clubs still have their trip continuity records intact? Better than a complete abandonment was shortening each trip. Next winter more snowshoe hikers will take to the trail—and three restful seasons intervene, thank goodness.

May Gadget List

1. Forum editor finds his third leg an aid on the heights and a silent, uncomplaining companion. He has hunted high and low among sport equipment catalogs, hoping to find a listing, however obscure, of hiking sticks. Canes stocked by most local stores are too frail or too decorative for rugged trails or cross-country going. By chance he learned of a Vermont hiker—an expert wood carver—who makes a specialty of native wood canes—over 30 kinds, sold by mail.

2. An automobile trunk which, when opened and assembled, expands to ten times its normal size. Functions as a two-bunk cabin, equipped with full-size beds, and contains a kitchenette and dressing cabinet. Weighs 300 lbs.

3. A Finnish importer offers a line of beautifully-finished scout knives. Leather sheath has a metal edge to prevent sharp blade forcing its way through the leather.

4. A macaroni product of high protein flour combines ten dehydrated vegetables. It is a one-dish meal, if meat is not desired. Product comes in five fantastic shapes, packed in 8 oz. and 1 lb. Cellophane bags. Minimum cooking time, maker's estimate, is eight minutes, but food is improved by leaving it on the fire twice as long. Camp cook might try, for fun, a mystery meal, with "sea shells and rubber bands" as chief items.

Pestiferous Months Ahead

A tranquil feeling steals over the user o the woods and hills on a salubrious mid summer day. But the wise hiker and campe does not allow capricious Dame Nature t pull the wool over his eyes, for she ca strike a nasty blow in the most unexpecte places. Every first-aid kit needs some season able additions.

A hiker or camper may, during a suc cession of one-day or week-end summe trips, suffer nothing more serious than few mosquito bites, a bee sting and a mil outbreak of poison ivy. Efficacious remedies applied on the spot, reduce the pain an discomfort, and lessen the tendency to spread

The Forum editor has tramped two day a week in rattler and copperhead countr during past summers. In no season has h seen more than five venomous reptiles. The were as anxious as he to avoid close con tact. Suppose he had been momentarily care less with his hands while clambering ove the boulders—and a copperhead shoul strike? Out would come the suction outfi and the serum, used in the order named.

The serum, which costs $10.00, and i good for five years, should be regarded a snake bite insurance at $2.00 per annum— a small premium for the protection it affords When the serum is used in conjunction wit a suction outfit ($1.50 to $2.50), the pro tection is doubled.

There is a long list of advertised remedie for snake bite, poison ivy and oak, mosquit bites, bee stings and other summer pests Forum editor, who does not pretend to know them all, has a representative list to offe for a stamp. Ask for the *Pestiferous Month Ahead* circular.

Maine Vacation Guidance

Maine Appalachian Trail literature has like Topsy, "just growed." Our library con tains the first guide book, a later supple ment, a sheaf of separate maps and the sep arate Katahdin booklet. All the above, along with corrected detail and much added in

What more appropriate token of affection than flowers in all the beauty of perfection? To be perfect, however, flowers must be guarded against insects that damage and destroy.

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formation, is packed within green suede covers in the handy pocket-size format. A bumper dollar's worth, as the six regional maps originally sold for more than that sum.

An innovation is the describing of trail sectors in both directions. The tendency for the user of a painted trail is to relax his vigilance. This is hazardous in the Maine wilderness. Maintenance crews cannot cover the 224 completed miles as often as they desire—and lots of things can happen to temporarily eradicate an important link in the marked route. The book warns users not to go beyond one-sixth of a mile without visible proof they are still traversing the A-T.

A double-check on the direction is the use of painted numerals, representing the number of miles from Katahdin, the northern terminal.

The hiker who, day by day, uses that characteristically Maine institution—the sporting camp circuit—has his departure telephoned to the next camp. Getting lost in Maine can have serious consequences, so no chances are taken.

The Maine Appalachian Trail Club is to be congratulated on its first publication, obtainable from 901 Union Trust Bldg., Washington, D. C.

Walk-Ways in Missouri

The Walk-Ways Committee of the St. Louis Community Council has expanded into the Missouri Walk-Ways Association.

The trail projects on the spring program will be coordinated with a chain of Youth Hostels. Trails are being approved over private tracts because the MWWA promises a close check of the users. The hiker's passport will be the MWWA membership card. We presume violators, as in the Youth Hostel movement, will be requested to turn in their membership cards.

Trail administrative organizations elsewhere might win property owners over on such a basis, and also obtain a supplementary source of revenue. The clubs do most of the trail work, contributing labor and paying out money for paint, tools and markers. Many solo hikers will, we are sure, be willing to do their share. Even now some do so voluntarily.

The MWWA is an administrative body, promoting the organization of clubs within its jurisdiction as soon as trails and shelters exist. In return for his annual subscription of fifty cents, the Missouri hiker will receive a printed bi-monthly bulletin of information, and a membership card. Headquarters are at 613 Locust Street, St. Louis, Mo. Ralph E. Mooney is chairman, and Karl G. Johanboeke, secretary.

Tin-Canners in Name Only

The *Tin Can Tourists of the World* may, to the initiated, suggest an organization whose members litter camping places with emptied tin cans. The motor camper has been the subject of condemnation by those who truly love our wilderness areas. The considerate minority is always overlooked when the sparks of criticism fly.

Here we have an organized army of over 36,000 motor campers pledged to leave oc-

(Continued on page 315)

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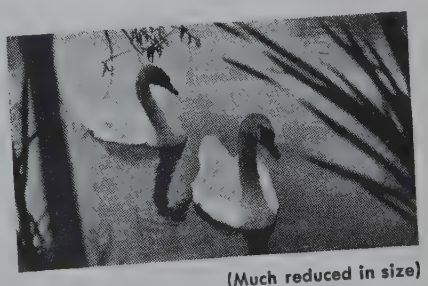

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ATLANTIC CITY

Bird Calling—A Profession

By Helen Hutson Weber

If anyone had told Ida May Cook when she was a little girl in Connecticut that she was destined to become one of the country's most celebrated bird callers, she probably would have stared in amazement. And yet that is her profession—a bird caller!

As a child Miss Cook early evidenced a love of the fields and woods, and it was there that the embryonic diva of birdland first began to call to the birds in their own language. The thrill of successfully counterfeiting the dialect of the lark and bobwhite as to gain a response so enthralled her that she spent all possible time out of doors, and even could be found on snowy winter afternoons calling the sparrows and finches to their banquet of crumbs.

With maturity, her skill and fame grew until she was officially commissioned by Florida's Governor to reproduce the calls of the birds of that state at the Century of Progress in Chicago. This feature proved extremely popular and thousands of visitors to the Florida exhibit pleasantly recall the trills which rang through the air at Miss Cook's recitals.

For the past two summers Miss Cook has profitably combined business with her favorite outdoor sport, serving as counsellor at a girls' camp, Camp Sebowisha, on Indian Lake, Maine. There, during the summer months, she startles the birds as well as the campers by her clever imitations. Probably unique among the country's camps in including bird calling among its attractions, Sebowishans find that it is especially good fun. Many are the secret signals—mysterious calls and highly exciting messages exchanged between Counsellor Cook and her charges.

The riding, swimming, hikes, canoeing and general sports form a background for the fun of bird talk. It is interesting to see how even the smaller Juniors soon master the knack of emulating the native birds of Maine. Also, it has proved to be an inspiration to the study of bird life, and many a youthful camper finds herself painlessly introduced to ornithology without realizing that her fun bears any such formidable title.

Translating the Snow Signs

When snowy carpets lie on the ground in our great wilderness parks, the naturalist's studies of the wildlife are made much simpler. Like hieroglyphics in the fresh snow the creatures of field and forest leave their tracks; tracks which his knowledge of their world enables him to read. In Glacier National Park such signs have told the staff that mink are more abundant than they have been since the area became a park, that weasels also are plentiful, their heaviest concentration being in those regions where snowshoe rabbits are to be found. Otter signs have been reported in several districts, and on the increase, judging from their tracks. These indicate that they are traveling in pairs with one or two young lynx following. In connection with the marten tracks are other signs, indicating rabbit kills by these animals.

Camps for Girls

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Hiking and Camping Forum

(Continued from page 313)

cupied sites immaculate, quench all fires, and respect private property rights.

The TCT hold two big gatherings every year—a summer reunion in the north, and a winter homecoming in the south.

The organization dates back to 1919, when motor camping facilities were meagre. Small groups, strangers until the Spirit of the Open Road had brought them together, conducted informal pow-wows in public camping grounds.

The TCT has, since its start, avoided commercialism. All administration expenses (there are no salaried officers) are met from the sale of membership pins and radiator emblems at fifty cents each, and also the conducting of trailer shows. There are no dues or initiation fees. The initiation ceremonies are of the ritualistic type. Informative literature available for a stamp from the Royal Assistant Secretary, who is Elliott L. Gyger, 3095 W. Boulevard, Cleveland, Ohio.

Western North Carolina

Those who intend visiting Western North Carolina during 1936 should procure the latest Carolina Mountain Club folder.

Four *On Your Own* trips near Asheville are summarized. The Sunset Mountain trip, half or full day, with walks of from 2 to 12 miles, is flexible enough to suit one and all. Local map sources of supply are cited.

The folder gives the schedule of CMC trips for current calendar year. Marcus Book is down for three strictly utilitarian trips—Appalachian Trail maintenance, which he regards as a labor of love.

Visitors are welcome on CMC scheduled events provided they select those well within their endurance, observe trail regulations, and make reservations at least a day in advance.

Principal CMC officers are Dr. O. C. Barker, president; R. V. Morrow, vice-president, and Miss Marie Powell, secretary-treasurer. Headquarters are at Smoky Mountain Tours Office, Arcade Building, Asheville. In writing for the folder, an appreciated courtesy will be a stamp to defray postage.

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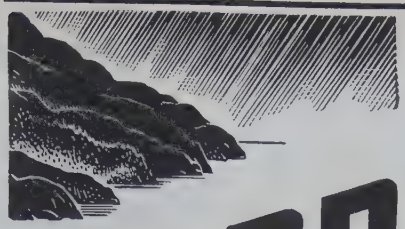

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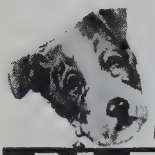

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Mr. and Mrs. Dildilian found the bag satisfactory during cold, wet July nights on the Long Trail of Vermont.

George Wright and Roger Toll

All friends of wild creatures and the mute world of wildlife itself have suffered a major disaster in the loss of George M. Wright, chief of the Wildlife Division of the National Park Service, and Roger W. Toll, for the past eight years superintendent of Yellowstone National Park.

These men, two of the most valued executives of the Park Service, were killed in an automobile accident near Deming, New Mexico, on February 25. Both were traveling on official business as members of the special commission of scientists jointly appointed by this government and Mexico to investigate the possibility of international parks and wildlife refuges along the Mexican border when the accident occurred. An approaching car, carrying a family party of four, blew a tire as it passed the government car driven by Mr. Toll at the one point on the lonely highway where it was impossible to avoid a head-on collision. The 17-year-old son of the driver of the other car also was killed.

Mr. Wright, who was born in San Francisco in 1904, had achieved fame as a naturalist even before his graduation from the College of Forestry of the University of California in 1927. The young student had accompanied an expedition to Mount McKinley National Park, Alaska, to make biological studies. There, on the alpine tundra, 1,000 feet above the timber line, his keen powers of observation led to the location of the first recorded nest and eggs of the surf bird, long sought by ornithologists. After finishing college, Mr. Wright entered the National Park Service where his work as a naturalist in Yosemite National Park quickly won him outstanding recognition, especially in the development of Yosemite Valley Museum. So great was his concern for the wild creatures that he carried on, at his own expense, an extensive study of their needs. Signal testimony to the value of his services occurred when the National Park Service established its wildlife division and named Mr. Wright as its first chief. He was later active in the formulation of the Emergency Conservation Work program.

Need for the guiding judgment of men of far-seeing vision and unswerving idealism arose again when the National Resources Board assigned to the National Park Service the duty of preparing a report on the recreation section of its own survey. To this task Mr. Wright and Mr. Toll were assigned in April, 1934. No basic material existed on which to found their facts and the task called for balanced judgment and highly specialized knowledge. The report now in press gives a comprehensive view of the whole national recreation program and points the way to its proper development and coordination.

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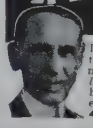

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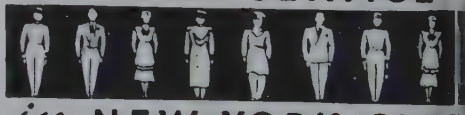

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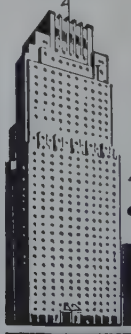

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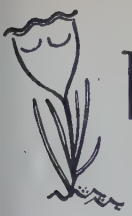

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Mr. Toll, who was born in Denver, Colo., in 1883, graduated from the Manual Training school of that city in 1901, studied two years at the University of Denver, and in 1906 graduated from Columbia University with the degree of Civil Engineer. In 1907 he served as engineer under the Massachusetts State Board of Health, accompanied the Coast and Geodetic Survey to Alaska the following year, and, on completion of this assignment, became chief engineer of the Denver Tramway Company. During the World War he served as captain and major in the Ordnance department of the Army. Entering the National Park Service, he served as superintendent of Mt. Rainier National Park, Rocky Mountain National Park and Yellowstone National Park. At Yellowstone he directed the management of the largest game herds in the park system.

Always a staunch friend of wildlife, Mr Toll was instrumental in developing and carrying out the policies that have made this area famous for its display of wild animals. Through his tactful handling of public relations there was built up between Federal and State agencies a cooperation that might well serve as a model. On foot, horseback and from the air Mr. Toll had visited and studied little known regions of the United States from the Florida Everglades to Mount McKinley National Park, Alaska. No other man in the Park Service knew so well, as an eye witness, the physical geography of the United States. It was his report on the Big Bend region of Texas that resulted in Congressional action authorizing the Big Bend National Park.

The death of these two men will leave a void in the ranks of public spirited scientists that will be hard to fill.

Minnesota Bird Book

A book of bird pictures in color, entitled *295 American Birds,* has been published by the University of Minnesota Press. The book, compiled by Dr. Thomas S. Roberts, director of the Museum of Natural History at the University of Minnesota, contains 92 large color plates, made by a special process from original water color paintings by Allan Brooks, W. A. Weber, Francis Lee Jaques, George M. Sutton, Walter J. Breckenridge, and Louis Agassiz Fuertes. An index prepared by Dr. Roberts, giving the scientific and popular names of each bird depicted, is included. All the more common land and water birds of the central and northern United States and southern Canada are among the species shown in the plates.

The University of Minnesota Press also has in preparation a revised edition of Dr. Roberts' two-volume "Birds of Minnesota," now out of print except in the de luxe edition.

Bird Life at Navajo National Monument

Betatakin Canyon in Navajo National Monument, at Shanto Springs, Arizona, is a natural feeding ground for birds and is a rich area for their study. The birds find so little trouble in satisfying their hunger that the custodian of this interesting ruin reports that the only species deigning to partake of the offerings he put out for them were the Woodhouse jay, the junco, and the green-tailed towhee.

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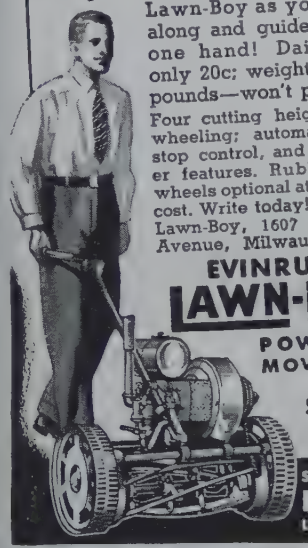

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Westchester Gardens

Seven Westchester gardens, ranging in size from an acre to over 300 acres, and in style from the informal to the most stately, will be open to the public on consecutive Saturday afternoons from May 9 through June 6 for the benefit of the Westchester County Children's Association of White Plains, N. Y.

First in the series is the garden of Mrs. Louise Beebe Wilder, at Bronxville, whose small rock garden has served as a laboratory for growth of rare plants from all over the world. It will be opened on Saturday afternoon, May 9.

On Saturday afternoon, May 16, visitors may stroll through the magnificent Greek gardens of Mr. Samuel Untermyer at "Greystone", his estate at Yonkers, and view the famous cryptomeria walk, color gardens, and the rock gardens facing the Palisades.

The garden of Mr. and Mrs. Richard H. Mandel, whose house at Mount Kisco is an outstanding example of modern architecture, will be opened on Wednesday afternoon, May 20. Situated 600 feet above sea level, it overlooks the Croton Reservoir.

At "Hi-Esmaro", the estate of Mr. and Mrs. H. Edward Manville at Pleasantville, a new lake adds to the rustic woodland scenery. The rock garden is also a feature of the estate, which will be opened on Saturday afternoon, May 23.

"Meadow Farm", the estate of Governor and Mrs. Herbert H. Lehman, at Purchase, which will be opened on Decoration Day, takes its name from the cultivated meadow land which forms a large part of the grounds. But the garden itself, a restful place, has also a series of formal terraces against a background of woodland, a diminutive play garden, and a stone grotto mirrored in the swimming-pool.

Mr. and Mrs. George Arents, Jr., are opening their estate "Hillbrook", at Rye, on Saturday afternoon, June 6. Landscaped in the fashion of an English park, the estate has formal gardens, rock gardens, woodland and acres of rolling lawn.

The sea and a formal garden by moonlight —this is the offering of Mr. Charles N. Edge, at Parsonage Point, Rye, who will open his garden the evening of Saturday, June 6, as the closing event of the series. Bounded on three sides by Long Island Sound, the garden is known for its formal beauty in any season of the year, and each tree and shrub in it has garden meaning. Visitors, who are invited from 7 to 11 P.M., may wander about the garden or along the sea wall to the strains of stringed music provided by the faculty of the David Mannes Music School.

This season is the ninth in which gardens of Westchester have been opened to the public by the Children's Association; the ninth in which garden lovers are invited to examine at first hand both the rare cultivated plants and wild flowers in which Westchester gardens abound.

Further information may be secured from the Westchester County Children's Association, 185 Main Street, White Plains, New York.

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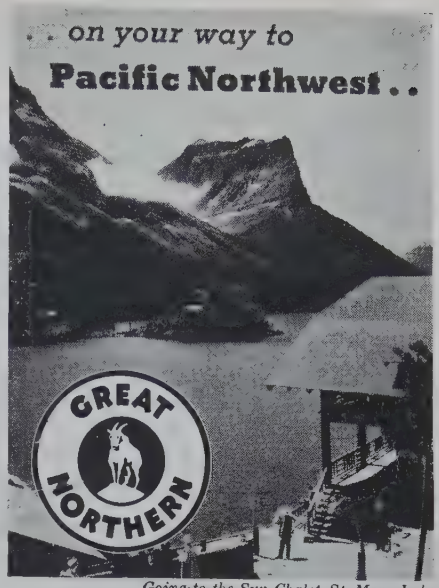

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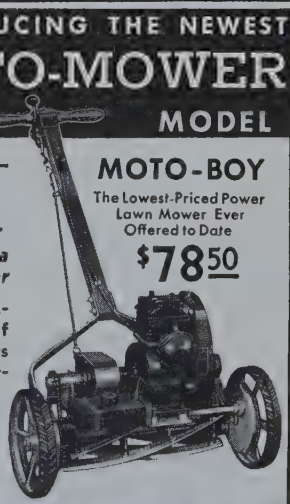

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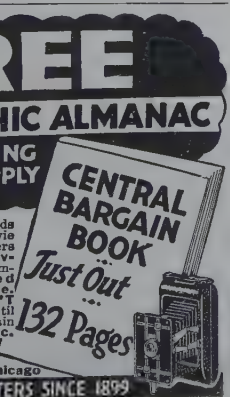


Nature Course Change

The outdoor course in Natural History given by the Division of General Education of New York University and sponsored by the American Museum of Natural History will hold a two-week session July 5 to 18. If enough students desire to continue for a third week, the session will be continued for that period. Headquarters will be at Farmingdale, N. Y., and complete information can be obtained from Miss Farida A. Wiley, American Museum of Natural History, 77th Street and Central Park, West, New York City.

Counselorship Course

A ten-week course is offered to young men interested in camp counselorship training by Surprise Lake Camp, Cold Spring, N. Y. The course begins July 1 and continues through Labor Day. Only those applicants who are in good health and have a genuine interest in camping and working with children will be accepted. For complete information and cost of the course, write to Mr. Max Oppenheimer, Administrator.

Audubon Camp

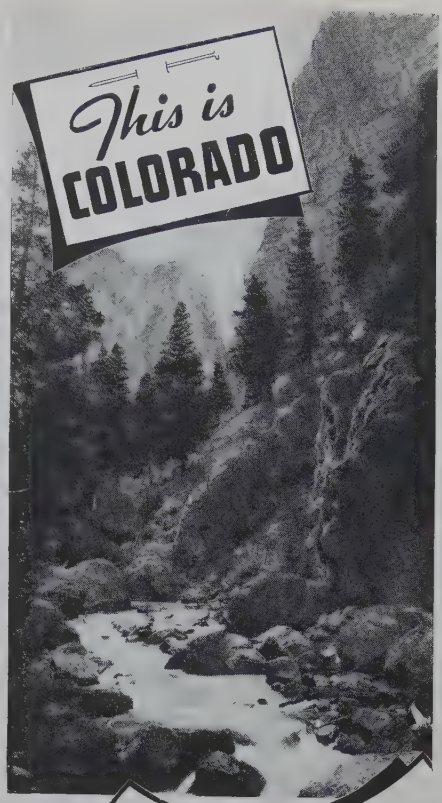
The Massachusetts Audubon Society announces a two-week camp at Cape Rosier, Penobscot Bay, Maine, for the first fortnight in July. The camp is in a wonderfully secluded, picturesque region of spruce-clad granite promontories and deep, winding inlets. The flora of the region will be in full bloom at this time. As camp accommodations are limited, early registration is advisable. On or before June 10 a registration fee of $5.00 should be sent to Winthrop Packard, treasurer, 66 Newbury Street, Boston, who will supply full information about the camp.

Window Gardens

The increasing interest in window gardening has brought forth the demand for a book that will give to the average amateur necessary information on the propagation, potting, watering and general care of them. *The Window Garden,* by Bessie Raymond Buxton, is the answer to this demand. Clear instructions are given for hybridizing in this volume, whereby anyone may produce new and lovely varieties. Suggestions are also made for overcoming hot, dry air, the greatest foe of house plants. The book, published by the Orange Judd Publishing Company, New York, retails for $1.50.

Dog Dictionary

The second revised and enlarged edition of Will Judy's *Dog Encyclopedia* is the Britannica of dogdom and can answer practically every question that might come to the dog owner's mind. It contains 587 articles, 375 illustrations, and 325,000 words—all about dogs. The articles about health, care and disease of dogs are especially worthwhile. American and world breeds are presented, and the official standards of all breeds are set forth. The volume, priced at $5.00, is available from the Judy Publishing Company, Chicago.



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Photographic Notes

BY SAMUEL BROWN

Flowers and Gardens

Flowers and gardens are becoming, each day, more beautiful. They are a real inspiration to the naturalist photographer. With the proper use of modern films, even the simplest box camera becomes an efficient instrument for the taking of flower portraits.

While any film will give fair results, it is best to use a panchromatic emulsion which is fully color sensitive and renders the various colors closest to their proper tones of grey. Films such as Verichrome and Plenachrome may be sufficiently corrected for color with the use of a K-1½ or K-2 filter. Where full, perfect correction is required, the use of an X-1 filter with panchromatic film is recommended. Since panchromatic film is slightly over-sensitive to red, some red light must be prevented from reaching the emulsion. This is accomplished by the X-1 filter which is pale green in color.

Since filters hold back a certain amount of light, exposure must be increased to compensate for this loss. The factor for a filter when used with a certain film is the number of times the proper exposure *without* a filter must be multiplied to give correct exposure *with* the filter. The filter factors, when used with the films recommended, are as follows:

Filter	*Verichrome*	*Panatomic*	*S. S. Pan*
K-1½	4	1½	1½
K-2	4½	2	2
X-1	—	4	3½

Pictures of complete gardens are interesting. If the house fits into the composition it is desirable to include it. A tree is a good object with which to frame the whole photograph. In the picture shown herewith, the tree is an important factor. Important also is the lighting. When the sun is directly overhead, deep, heavy shadows are cast resulting in extreme contrast. Flower and garden pictures should be taken preferably during the early morning or late afternoon hours or on a day when the sunlight is filtered through light clouds giving a diffused effect. It also should be remembered that the air is almost motionless during the early morning making this the ideal time for flower photography.

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"A GARDEN IN JUNE." TAKEN AT 1/25 OF A SECOND, F.11 ON SUPER-SENSITIVE PANCHROMATIC FILM

Pictures of single flowers are especially valuable but require extreme care in photographing. Aside from the film and a suitable filter, a portrait attachment should be secured. When attached to the lens of the camera they permit approaching the subject and photographing it from a short distance. Besides the above essentials, the following will be found useful: a tripod, two pieces of cloth or cardboard, one light grey and one black for backgrounds and several pieces of string, the latter simply for tying uninteresting shrubs and branches out of range of the camera.

Depth of focus is highly important and for this reason a small stop should be used. With box cameras the smallest opening should be in place; other cameras should be set at between F.16 and F.32. Naturally, long exposures will be necessary when such small stops are used and so the pictures should be taken at such time when there is no wind. Larger openings and shorter speeds will be needed if there is wind but it is advisable to wait until conditions are ideal. It will be found that exposures of 1/10 of a second are required on a hazy morning at stop F.22.

The background should be used to contrast with the color of the subject. A frame should be set up behind the flower to be photographed and the light colored cloth stretched over this if the blossom is a dark one. If it is light, the black cloth should be used. It is important to see that the background is carefully stretched so that no wrinkles will show.

Do not try to include too many flowers in your picture. One or two blooms, or in some cases a small cluster, will make the most attractive photographs.

The point of view is, many times, the factor which makes the picture a good one or a bad one. One rule that should be remembered is that it is generally a poor policy to look down on the subject. Pictures should be taken preferably on the level or from slightly below. This is particularly true when the blossom is facing the camera. Profiles of flowers facing the sky may be taken from a slightly higher point of view to show the petal detail.

* * *

Color Movies

The summer offers an opportunity to take motion pictures in natural colors unmatched during any other time of the year. The flowers swaying in the breeze, scenes of the garden, the woods and the trees, all of them forming a brilliant symphony of color. Taking moving pictures in natural colors is as simple as black and white. Just open the lens one stop greater than for regular movies. No extra equipment is necessary; a roll of *Kodachrome* film is all that is needed.

For the movie enthusiast interested in indoor motion pictures, a new Kodachrome film is available. This is called *Kodachrome Artificial Light Film, Type "A"* and is four times as fast as regular Kodachrome under artificial light. While not radically different from the original, the new film does not require a filter for use with photoflood bulbs. It may also be used out-of-doors with a special orange filter.

A little Kodachrome handbook is available from this department for those interested. Please send a stamped self-addressed envelope.

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Camera Types

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subjects. They differ from regular roll film cameras in that they have a ground glass for focusing the image sharply. After the image is focused, the ground glass is replaced by the film material to be used. This may be either in a film pack adapter or a plate holder containing glass plates or cut films. These cameras have a versatility exceeding that of most other types.

Film pack cameras, as they are often called, are usually equipped with F.4.5 lenses. In most cases these are set in Compur shutters giving a range of instantaneous speeds ranging from one full second to 1/250 of a second. Rising and sliding front for including more of the upper or lower part of the subject without tilting the camera are generally found on these instruments. Besides the ground glass, focusing may be accomplished by a scale. Brilliant and direct vision finders are usually standard equipment. Many of these instruments have a double extension bellows which permit taking life size pictures without the use of extra lenses. These supplements are, however, available in the form of *proxars* and *distars* which increase the use of the camera by changing the focal length of the regular lens. The former shortens the focal length thus increasing the angle of view, while the latter increases the focal length and gives a larger image of a distant view.

For the Nature photographer a film pack camera is an ideal instrument. It is immediately useful for a close-up of an insect or a flower or for a distant landscape. Practically every kind of film material is available which with the mechanical makeup of the instrument makes it an excellent all around camera.

* * *

Trade Hints and New Books

A 48-page pamphlet dealing with photographic chemical processes in general and fine-grain development in particular is available from this department. Two very instructive articles by leading specialists on fine grain development, a number of formulas for the best known developers, emulsion classifications, contrast and gamma charts and other information of considerable interest is part of the book. These pamphlets are available from this department without charge. Please send a stamped self-addressed envelope plus a one cent stamp with your request and ask for the *VereBest Book.*

* * *

E. Leitz, Inc., 60 E. 10th St., New York, N. Y. have informed this department of a new accessory to the Leica which permits the taking of pictures at high speed. A roll of 36 exposures may be made in less than half a minute! Those interested should communicate with the above organization for further details.

* * *

The *Trojan Film Washer* is a gadget which washes film more efficiently and in less time than is possible by most other methods. Simple in operation and inexpensive at 49c, it should find a place in every photographers darkroom. Available from the Central Camera Co., 230 So. Wabash Ave., Chicago, Ill. (Continued on page 375)

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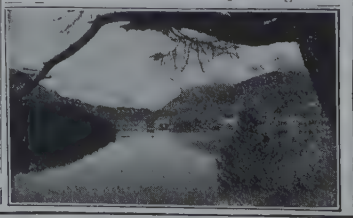

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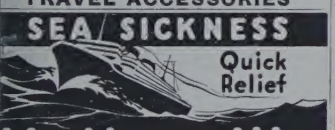

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Why Harm the Bluejay?

By Wayland E. Mills

Conservation, in the minds of a fast growing group of people—namely the so-called sporting group—is carried out by two methods. First, the planting of *home grown* game, to be harvested at the earliest possible opportunity; second, sweeping the woodlands clean of every bluejay, hawk, owl, red squirrel and so on down the list. This last method is seized upon by sportsmen to justify the target practice during the closed season.

It has been my pleasure, at different times, to observe the actions and habits of bluejays, and at no time have I ever seen a bluejay in any way harm game birds or songsters, or attempt to invade their nests. But I have seen hunters traveling through the woods, get an itchy trigger finger and, not stopping at jays, shoot everything in sight that resembled feathers or fur, including our most beautiful songbirds. Conservation? Nothing but wilful taking of life. Hardly excusable in a small child, but in a man, simply showing an inhuman urge to gratify a perverted sense of pleasure.

Each winter the feeding station in our back yard is the meeting place for large numbers of birds, including jays. Sometimes there are as many as half a dozen jays arriving at the same time, and I have yet to see them show a disagreeable trait in their associations with their other feathered friends. If the table is full when they arrive, they always seem very agreeable in waiting their turn until it is less crowded, like true ladies and gentlemen.

They simply won't quarrel with their neighbors, and until a much stronger argument has been presented, I shall remain a firm friend of the jays, and a confirmed enemy of promiscuous shooting conservationists.

A total of 69,720 acres of deer refuges has been established by the Wisconsin conservation department since the refuge program was launched in 1934.

Young Robins Saved

By M. L. Hulme

In the early spring a pair of robins built their nest in the eaves trough of the residence of Mr. L. P. Gunson, Summerville Boulevard, Rochester, N. Y.

Three young birds were hatched one cold, windy day; while they were so young that they were yet without feathers, the nest and birdlings were blown to the ground. One fell on the stone walk leading to the entrance of the house and was killed. The other birds fell, one on either side of the front door and into the shrubbery. This broke their fall and saved their lives. Someone from the house discovered them and took them into the house, almost dead from cold and exposure. They were warmed and then put in the nest, which was fastened to the sill of the window almost directly beneath where the nest had been.

As soon as the small birds were placed in the nest the old birds came and brooded and fed them. They lived to grow up and flew south in the fall.

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In June, Olive Thorne Miller

"JUNE passed away in delightful bird study," Olive Thorne Miller wrote in one of her best books. Born herself in June—on the twenty-fifth of the month, in 1831—Mrs. Miller during the last four decades of a life that ended on Christmas Day in 1918, at the age of 87, found apparently her greatest delights in observing birds, and in writing about them for others. Eleven bird books written by Mrs. Harriet Mann Miller under her familiar pseudonym were published by Houghton Mifflin and Company between 1885 and 1915, and a pleasant half dozen are sketch books of the out-of-doors—works that "while beguiling us with the story of the bird" have, in the words of Florence Merriam Bailey, set the bird "in its landscape, . . . brought home to us 'the river and sky', . . . enabled us to see Nature in its entirety." The titles themselves are enticing reading—*Bird-ways, In Nesting Time, Little Brothers of the Air, A Bird-lover in the West, Upon the Tree-tops,* and *With the Birds in Maine.* And, quite agreeably, these books for the most part are descriptions of Nature in June—Mrs. Miller's own natal month.

After her interest was first aroused, when she was nearly fifty years old and "knew by sight not more than two birds," Mrs. Miller spent summer after summer in the field. "What I care to see," she wrote, "is the natural life, the free, unstudied ways of birds who do not notice or are not disturbed by spectators."

The incidental acquaintances that Olive Thorne Miller made with the insects, the flowers, and mammals during her bird studies in June could, if duplicated, enliven the month for an outdoors person in any year. On one adventure that she "almost had" she noticed "in a depression in the ground at my feet a squirming mass of fur . . . four or five little beasts . . . really beautiful; black and white in stripes, with long bushy tails . . . 'Mephitis'." She writes of watching the woodchuck; and a chipmunk one day "came out of his snug door under the roots of a maple-tree and sat up on his doorstep—one of the roots—to make his morning toilet, dress his sleek fur, scent the sweet fresh air, and enjoy himself generally." Another time she wrote: "Every squirrel under whose tree we chanced to pass first shrieked, and then subsided into a sobbing cry or a scolding bark, according as his fur was gray or red."

The flowers in June were to her such a delight that her books are profuse with references to "a nosegay of blue violets"; "elder-bushes, with their fine cream-colored blossoms"; the "snowy flowering" of blackberry bushes; buttercups and red clover flourishing in the grass; and daisies that in a light breeze "looked all alive, as if nodding and laughing together like a party of jolly children." When she went to the West she was so deeply enamoured of the many blooms new to her that she wrote of them at length, telling of the June flowers of Colorado—"the full-blown bells of the yucca, cream-tinted or pink, and fragrant as the breath of summer;" the "cream-colored satin flowers" of the cactus; the blossoms of the gilia "like fairy trumpets, in many shades, from snow-white to deep rose, and brilliant scarlet, with great variety of delicate marking;" and the three petals of the mariposa, or butterfly lily, forming "a graceful cup of differing degrees of violet hue;" the golden columbine, primrose, vetches, cyclamens, and others.

Some of the insects of the month are in these sketch books, too. Once after describing the flowers in a Colorado nook, Mrs. Miller wrote: "Over all this growing glory butterflies flutter, and bees go hither and thither, and still higher zigzag dozens of dragonflies". Another time she writes of dragonflies acting "exactly like fly-catching birds, staying an hour at a time on one perch, from which every now and then they sallied out, sweeping the air and returning to the perch they had left." There, Mrs. Miller admitted, her attention was "divided between the birds, the dragonflies, and the clacking grasshopper, who went jerking himself about with a noise like a subdued lawn-mower." And, of course, the mosquito finds its place in Mrs. Miller's pages, most interestingly when she tells that in Colorado she "found but a solitary individual, and that one disposed to coquette with me."

But every one of these volumes is a bird book. "No emotion whatever," the author wrote, "no beauty, no sublimity even, can make me insensible to a bird note," yet she seemed equally zealous in her study of nesting habits. "To find a newly built nest," she declared, "is the first June work of the bird-student." Her chapter on the home life of the redstart comes quickly to mind, with its description of these "roguish" warblers "diving and flitting about on a tree like specks of animated sunlight", the "small cradle, gently rocking in the warm breeze" from near the top of an apple tree—together with one more sample of Olive Thorne Miller's offerings to those who wish to read of Nature in June: "One evening," she wrote, "listening on the piazza to the usual twilight chorus, the wood-thrush far-off, the towhee from the pasture, the robins all around, I heard suddenly the 'quee-o' of a bird I knew, so near that I started, and my eyes fell directly upon him, standing on the lowest limb of a dead tree, not ten feet from me . . . quivering with excitement, his wings lifted a little . . . I held my breath, and he repeated it, each time lower than before. Even at that distance it sounded far off, and doubtless many times in the woods, when I looked for it afar, it may have been over my head. A long time—how long I cannot guess—that beautiful bird sat and sang his witching evening hymn, while I listened spellbound. It was the tawny thrush—the veery."

—By HOWARD ZAHNISER

THE LAST TREE

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